

**THE 'NAUHEIM' TREATMENT
OF DISEASES OF THE HEART
AND VESSELS IN ENGLAND**

LESLIE THORNE THORNE

SIXTH EDITION

BAILLIERE, TINDALL & COX

THE BRITISH SCHOOL OF OSTEOPATHY



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The 'Nauheim' treatment
of diseases of the heart
and vessels in England

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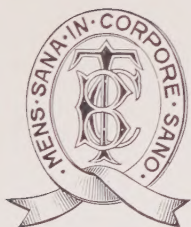
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PREFACE TO SIXTH EDITION

THE present edition has been rewritten, and much additional new matter added, especially with reference to the chapter on Arterio-Sclerosis and High Blood-Pressure, which contains the results of my latest researches on this subject. There is also an additional chapter on Auricular Fibrillation and Alternation, and all illustrative cases have been brought up to date.

Modern cardiological research has widened and improved clinical methods of diagnosis and elaborated the means of diagrammatic illustration. All this newly acquired knowledge of the mechanism of cardiac action has helped to prove more fully the great advantage of the "Nauheim" treatment of diseases of the heart and circulation, over the old methods of treatment by drugs and rest alone. The effect of the treatment upon cardiac conductivity, which is fully illustrated by polygraphic tracings, is of the utmost interest.

I have chosen the polygraph to illustrate all pulse tracings for four reasons: Firstly, for all practical purposes the polygraph is superior to the electrocardiograph, because it can be taken to the patient's bedside, and its tracings give all the clinically useful

information that the electrocardiograph gives; secondly, polygrams are much more easily understood, by those who have not specialized on the subject, than electrocardiograms; thirdly, the electrocardiograph sometimes fails to show the presence of alternation in the pulse (Thomas Lewis, "Clinical Electrocardiography," p. 100); and fourthly, because the electrocardiogram gives no indication of the character and volume of the pulse, whereas on a polygram it is always demonstrated.

I wish to express my sincere thanks to the editors of the *Lancet* and the *Practitioner*, through whose kindness and courtesy I am enabled to include diagrams and subject-matter which have appeared in those journals.

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108, HARLEY STREET, W.I.

February, 1923.

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THE "NAUHEIM" TREATMENT OF DISEASES OF THE HEART AND VESSELS IN ENGLAND

INTRODUCTION

I HAVE endeavoured, in the following pages, to give a practical description of the methods of administering the "Nauheim" treatment in England, in such detail that medical men who have no previous knowledge of it may, by carefully following the directions given, avail themselves of this very valuable therapeutic agent for the treatment of affections of the heart and vessels.

The fact that the treatment can be given anywhere where there is a bathroom and a good supply of hot water, with results as successful as those obtained at Nauheim, cannot be known too widely amongst the medical profession; and there is no doubt that balneological treatment of diseases of the heart or vessels can be administered quite as efficiently in England as it can be at Nauheim or elsewhere abroad, and the results obtained are quite as satisfactory. There is, indeed, a much wider range for home treatment than for treatment at a foreign spa, for many cases of chronic cardiac disease are quite unfitted

physically to undertake a long continental journey, whereas they are perfectly able to take a course of baths that can be given them in their own home, a nursing-home, or an hotel—a treatment that requires no further physical exertion than that of stepping from their bedroom to the bathroom, and back to bed after the bath.

Results have shown that the "Nauheim" treatment is by far the best for cases of arterio-sclerosis, as it will lower blood-pressure in cases of sclerotic hypertension, restoring such cases to health and prolonging life for years, and will cure cases of pre-sclerotic hypertension. These facts are clearly proved in the chapter on that subject.

For over twenty years I have practised the administration of this treatment in London, and during that time I have treated a very large number of cases. This experience has afforded me many opportunities of comparing the results of a course of baths taken at Nauheim with those of a previous or subsequent course in London, more especially since the year 1914, as I have had many patients under my care since that date who had formerly made a practice of going to Germany for treatment. It is not my intention to enter into a lengthy discussion of the theories of the treatment, except in so far as is necessary and desirable in a practical handbook for the busy practitioner; but as I have not found any sufficiently detailed description of it in medical literature, I have endeavoured to give

one in the following pages, trusting that it may be of value to those who are anxious to use a treatment the great value of which has been proved in past years, by the material relief and benefit large numbers of patients suffering from chronic diseases of the heart and vessels have derived from it.

There are still a large number of medical men in England who do not give these methods of treatment that place of importance which they rightly deserve as a therapeutic agent. The reasons for this are, I believe, twofold: Firstly, many are not aware of the fact that it can be administered in England with results as beneficial as those that have been obtained at Nauheim; and, secondly, there is still much misconception as to what really constitutes a course of "Nauheim" baths, there being a widespread belief that it is equivalent to a course of *carbonated effervescing* baths. This belief is entirely erroneous. Many medical men, therefore, who have given the treatment what they believe to be a fair trial, have prescribed a course of baths which would only be suitable and beneficial to a small minority of mild cases of heart disease, and would do definite harm to more serious cases.

I am convinced that many who have hitherto not used this treatment would be led to regard it as a most valuable agent in the treatment of diseases of the heart and vessels, were they to adopt those methods of administration which I have practised in London with highly satisfactory and successful results.

As the suitability of a case for treatment by the "Nauheim" methods is much more dependent on the stage of the disease than on its kind, and as most forms of chronic cardiac and circulatory trouble will benefit by treatment if not left till too late, I propose to give separate chapters on the chief forms of cardiac and circulatory diseases, with examples of cases treated, together with a chapter on "The Action and Administration of the Baths," and one on "The Description and Administration of the Resistance-Exercises."

Resistance-exercises are of use as an adjunct to the baths, and may sometimes be very beneficial in cases where, for various reasons, it is not possible to give the baths or as a preliminary treatment before beginning a course.

CHAPTER I

THE ACTION AND ADMINISTRATION OF THE BATHS

THE effect produced by immersion in a "Nauheim" bath upon a patient suffering from cardiac dilatation, raised blood-pressure, and the accompanying more or less degenerate and flabby cardiac muscular tissue, is threefold:

- (a) *All the cutaneous capillaries dilate.*—A fall in the blood-pressure is caused thereby, with consequent lessening of the resistance to be overcome by the cardiac contraction.
- (b) *The cardiac action is strengthened and its frequency diminished.*—This is a natural result of diminished cardiac strain, and can be illustrated by watching the pulse, which exhibits a larger volume and a slower rate; or by polygraphic tracings, taken before and after a bath (Figs. 1, 2, 3, 4, 5, 6).
- (c) *The cardiac conductivity is stimulated.*—In cases in which auricular or ventricular premature contractions are present, showing the existence of an impaired conductivity, such premature contractions often disappear, or markedly decrease in frequency during a bath (Figs. 1, 2, 3, 4, 5, 6).

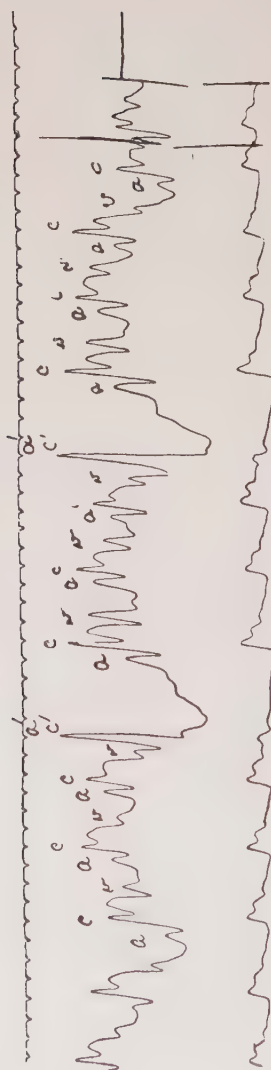


FIG. 1.—POLYGRAPHIC TRACING BEFORE A FIRST BATH, SHOWING TWO EXAMPLES (a') OF THE FREQUENT PREMATURE AURICULAR CONTRACTIONS, RATE 84 PER MINUTE. THE AURICULAR AND VENTRICULAR PREMATURE CONTRACTIONS OCCUR SIMULTANEOUSLY.

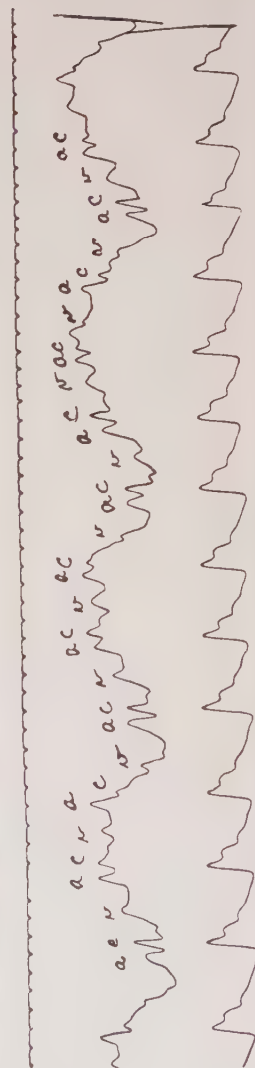


FIG. 2.—POLYGRAPHIC TRACING, AFTER A FIRST BATH, SHOWING PERFECTLY REGULAR PULSE OF STRONGER VOLUME AND SLOWER RATE, 75 PER MINUTE.



FIG. 3.—POLYGRAPHIC TRACING BEFORE A SIX-MINUTES' BATH, SHOWING ALTERNATION OF PULSE AND PREMATURE AURICULAR CONTRACTIONS (*a' c' v'*). THE CROSSES MARK THE LARGE AND THE STARS THE SMALL BEATS OF THE ALTERNATIONS.



FIG. 4.—POLYGRAPHIC TRACING OF THE SAME CASE, AFTER THE SIX-MINUTES' BATH, SHOWING PULSE OF GOOD VOLUME, NO ALTERNATION, AND ONLY SLIGHT SINUS ARRHYTHMIA.

From the above it will be seen that the results we obtain from a course of "Nauheim" baths are: a slower and stronger cardiac contraction, an improved cardiac conductivity, and, in cases of hypertension,

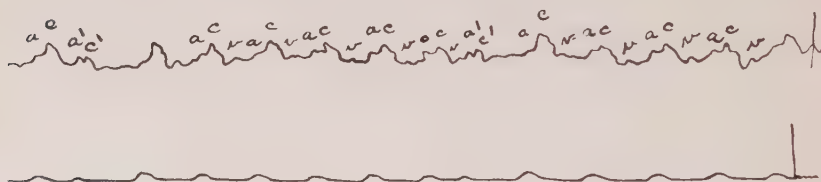


FIG. 5.—POLYGRAPHIC TRACING BEFORE FIRST BATH, SHOWING TWO EXAMPLES OF THE FREQUENT PREMATURE AURICULAR CONTRACTIONS ($a'c'$) AND A PULSE OF VERY SMALL VOLUME, RATE 75 PER MINUTE.

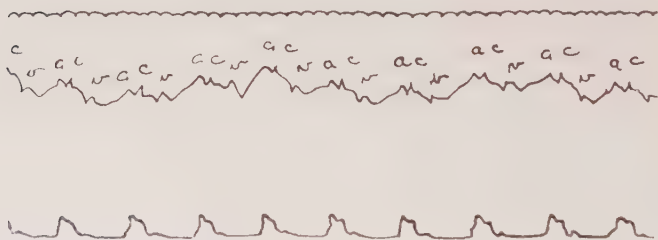


FIG. 6.—POLYGRAPHIC TRACING AFTER FIRST BATH, SHOWING PERFECTLY REGULAR PULSE OF GREATLY IMPROVED VOLUME AND SLOWER RATE, 62 PER MINUTE.

a lessened resistance for the heart to overcome. These results are *aimed at* in all forms of treatment used for cases exhibiting symptoms of failing cardiac contraction or conductivity.

By obtaining a slow and regular heart's action we obviously reduce the working-time of the heart—

i.e., the number of hours in which the heart-muscle is in systole during the twenty-four; and in lowering the blood-pressure we reduce the amount of resistance the heart has to overcome, thereby procuring not only a shorter, but an easier day's work for the heart; whereas, by using digitalis, we no doubt sometimes obtain a condition in which the working-time of the heart is reduced, but we do *not* lower the blood-pressure, and we actually *hamper* the cardiac conductivity, because digitalis has an inhibitory effect upon defective cardiac conductivity. Cushny¹ believes that, in auricular fibrillation, digitalis produces a direct inhibitory action on the cardiac muscle tissue. I. Harris² maintains that, in those hearts which do not respond to digitalis by a rise of blood-pressure, this drug should be administered with caution, since dilatation is the inevitable result of this disproportion between stimulus and muscular power; and that the strain on heart-muscle caused by a rise of intracardiac pressure after administration of digitalis might, in some cases, be more harmful than the benefit derived from its tonic properties.

Many cases which are only temporarily benefited by rest and the administration of digitalis, and others, which such treatment helps to a certain point but no further, improve rapidly under a course of "Nauheim" baths. This is partly due to the fact that the

¹ Cushny, "Digitalis in Auricular Fibrillation," *Lancet*, June 9, 1917.

² *Lancet*, March 30, 1918.

baths *improve* cardiac conductivity, whilst digitalis *inhibits* it, and partly to the *reduction* of blood-pressure obtained by the baths, in conjunction with a slower cardiac action and a toning up of the cardiac muscle.

Since the introduction of the polygraph for clinical use it has been possible to demonstrate diagrammatically the improvement in cardiac conductivity produced by the baths (Figs. 1, 2, 3, 4, 5, 6), and with the aid of this instrument, in conjunction with the use of the sphygmomanometer for the accurate reading of blood-pressure records, combined with the knowledge obtained from careful auscultation and percussion, we are able to observe the effect of treatment with an accuracy and certainty which was impossible only a few years ago.

There is a danger amongst a certain school of cardiologists to rely almost *entirely* upon the new methods of diagnosis, and thereby to under-estimate such valuable signs as the character of the heart's sounds and the extent of the area of cardiac dullness; if, however, this method is adopted, it will lead neither to a complete diagnosis nor to a satisfactory treatment.

In the opinion of I. Harris,³ "modern scientific contributions on heart disease are made up of tables laboriously compiled of minute measurements, of mathematical calculations. The accurate methods

³ "Modern Methods of Research in Cardiology," *Lancet*, May 13, 1922.

of physical science have been made applicable to the solution of problems in pathological biology. This method, more often than not, is quite unsuitable for research in clinical phenomena, hence, as is often the case, it leads to more absurd conclusions than deductions derived merely from subjective observation." There is no doubt that, to come to a true and accurate diagnosis in any case of cardiac trouble, one must not only take advantage of the information obtainable from the newest and best scientific methods of investigation, such as the polygraph and the sphygmomanometer, but one must also make a careful study of the character of the cardiac sounds, the area of cardiac dullness, and all other physical signs in any way connected with the heart and vessels.

The improved condition of the heart and circulation obtained in a "Nauheim" bath continues for some hours, giving the heart a comparative rest and enabling its muscular walls to regain some of the tone which a long period of dilatation has impaired. The beneficial effect of the bath is of longer duration after each successive immersion, and hypertension, if present, gradually decreases, so that the heart has a diminishing amount of resistance to withstand, is progressively more able to reap full benefit from the comparative rest, and more able to overcome any dilatation that may have been present at the commencement of the treatment.

The improved cutaneous circulation and strengthened heart's action indirectly affect all the functions

of the body, and produce a healthier condition of all the organs and a more normal state of excretion and secretion.

In a patient who has suffered for a long time from a bad circulation and a defective oxygenation of the blood, the organs are sure to be in a chronically congested, unhealthy, and probably degenerate condition. It is therefore to be expected that the improvement in the general health will only be gradual after the restoration of a more normal circulation, and that this improvement will continue for several months after the course is finished. This is exactly what occurs, and it is brought about by the comparatively slow and steady process of repair taking place in degenerate organs, provided for the first time for some years with a healthy, well-oxygenated blood supply.

This occurrence is so constant a feature of the treatment that one is able confidently to tell one's patients that they will continue to improve in health for some months after the baths have been given; and to assure those few who do not feel much immediate benefit, that they will do so in the course of a few weeks; and this assurance can be given with practical certainty that one's prognosis will prove correct.

Investigations carried out in order to ascertain the effect of any therapeutic agent upon cardiac systole and arterial tension must, to be of any practical value, embrace a large number of observations, and

those observations must be constantly repeated upon each individual patient, until the necessary details of manipulation required have become a matter of ordinary and commonplace procedure to the subject, so that the emotions of excitement or timidity may play no part in the alteration of blood-pressure to be observed. I have carried out several hundred observations under these conditions, taking a record of the maximum and minimum blood-pressure, and the rate and volume of the pulse, before and during every type of bath that is given in a "Nauheim" course. My observations include experiments carried out at Nauheim, with the aid of my brother, Dr. Richard Thorne Thorne.

These observations have proved beyond a doubt that the action upon the heart and vessels produced by a *natural* "Nauheim" bath is absolutely identical with that obtained by one artificially prepared; and also that the *immediate* result of immersion on a case of hypertension, whether pre-sclerotic or sclerotic, is a lowering of the blood-pressure by a material amount.

In cases of *sclerotic* hypertension, the *continued* administration of *effervescing* baths does produce a gradual rise of blood-pressure; whereas, under a course of *still* baths, properly administered, the pressure will gradually fall, and this condition will be maintained for a lengthy period, generally a year or more, occasionally for years, after the treatment. The details with regard to the right kind of baths

which should be used for the various forms of hypertension will be fully dealt with in the chapter on that subject.

In cases where the heart is dilated and the blood-pressure is *subnormal*, the arterial tension is usually somewhat raised by immersion in a "Nauheim" bath; the heart-beat is slowed and strengthened, and a more normal balance established between the driving power and the resistance to be overcome. These cases of subnormal tension in conjunction with a dilated heart are comparatively rare, as the heart does not, as a rule, dilate unless under the stress of an increased resistance to be overcome; but in patients who have passed through an acute illness, or in anæmic, thin, and debilitated subjects, the heart will sometimes give way, even when the blood-pressure is below normal, and in cases of this kind it is evident that the rise to the normal blood-pressure, in conjunction with the slower and strengthened heart-beat, indicate a stronger cardiac action and an improved circulation.

The following tables of blood-pressure and pulse-rate records, taken before and during baths, are from cases which differ greatly from each other as regards the condition of the heart and vessels, the only point in common being that, with the exception of Case IV. and the record of my own blood-pressure, taken in a bath at Nauheim, hypertension was marked.

CASE I.

				Blood-Pressure.	Pulse-Rate.
				Mm. Hg.	
Before bath	..	..	..	210	96
1 minute after immersion	..	..	..	200	96
3 minutes	..	..	..	180	92
5 "	..	..	..	180	92
6 "	..	..	..	188	92
8 "	..	..	..	180	88

CASE II.

				Blood-Pressure.	Pulse-Rate.
				Mm. Hg.	
Before bath	..	..	..	170	72
3 minutes after immersion	..	..	..	165	72
6 "	..	..	..	145	76

CASE III.

				Blood-Pressure.	Pulse-Rate.
				Mm. Hg.	
Before bath	..	..	..	180	76
2 minutes after immersion	..	..	..	160	76
4 "	..	..	..	164	72
8 "	..	..	..	160	72

CASE IV.

				Blood-Pressure.	Pulse Rate.
				Mm. Hg.	
Before bath	140	64
3 minutes after immersion	128	54
5 "	120	54

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CASE V.

MY OWN BLOOD-PRESSURE TAKEN IN A SPRUDELSTROM
BATH AT NAUHEIM.

				Blood-Pressure.	Pulse-Rate.
				Mm. Hg.	
Before bath	..	..	..	130	68
2 minutes after immersion			..	120	68
4	"	"	..	110	72
6	"	"	..	100	72
8	"	"	..	100	68
10	"	"	..	100	70

CASE VI.

				Blood-Pressure.	Pulse-Rate.
				Mm. Hg.	
Before bath	..	..	..	208	76
2 minutes after immersion			..	194	72
4	"	"	..	184	68
6	"	"	..	188	72
8	"	"	..	184	66
10	"	"	..	188	64

In studying the above tables it will be noticed that the pulse is not *always* lowered in rate during the bath. This condition, when present, is due to the fact that the material alteration in tension, produced in a few minutes, sometimes requires a more rapid cardiac action to fill the dilated vessels, and therefore the heart, though relieved from some of its work and able to contract more easily, does not *always* steady down to a much slower beat till a short time after the bath. If the pulse-rate is taken twenty minutes or half an hour after the bath, it will be found to have

materially diminished in rate, whilst still maintaining its improved volume. The minimum pressures have not been recorded in these tables, as the effect of the baths on blood-pressure will be dealt with in more detail in another chapter.

The diminution in the cardiac dulness which is noted after a bath is the natural result of the more efficient contraction of an ill-acting, flabby, and dilated organ. It is much more marked in some cases than in others, being more apparent in those in which *much* dilatation of the heart, with only *slight* hypertrophy, is responsible for the increased cardiac dulness, and practically absent in those in which there is *much* hypertrophy with only *slight* dilatation; hence it follows that one may judge fairly well as to the suitability of a case for the treatment by the effect a bath produces upon the cardiac dulness.

There has been much discussion as to whether this diminution of cardiac dulness is real, or whether it is only an apparent contraction caused by an expansion of the lungs, and a consequent overlapping and masking of some of the dull area. That the decreased dulness indicates a real contraction of the heart is, in my opinion, the only logical conclusion one can arrive at, to explain the undoubted improvement in the circulation which is usually noted after a single bath. What, however, is of far more import than the above, is the fact which has been conclusively proved, both by myself and other observers, not only by percussion, but by X-ray photographs, taken

before and after treatment, that the result produced by a *whole* course of baths upon a suitable case of cardiac dilatation is a marked diminution, and, in many cases, an entire cure, of that unsatisfactory and dangerous condition.

Theodore Fisher⁴ has proved by post-mortem examination that there is ample room in the pericardium for the heart to become dilated to three times its normal size, and D. W. Samways⁵ states that, when a chamber has by contraction reduced its diameter by one-half, its walls can exert eight times as great a pressure on the enclosed residual contents. It will therefore be seen what a very great advantage in strength is gained by a failing heart, if it is enabled to contract more thoroughly, and thereby reduce cardiac dilatation.

It is not possible to lay down a definite and universal rule applicable to the management of all patients, as the degree and kind of disease, and personal idiosyncrasies, materially affect the regulation of details in this treatment as in all others; but the following directions for carrying out a course will enable any medical man who is willing to give time and trouble and careful personal attention to each case, to give the "Nauheim" baths with every certainty of obtaining satisfactory results.

It is of the utmost importance to realize that a change of one degree in the temperature of the water,

⁴ *Lancet*, December 24, 1921.

⁵ *British Medical Journal*, April 2, 1921.

or a shortening or lengthening by one minute of the time of immersion, or a seemingly small alteration of the constituents of the bath, will often materially affect the result; and it is therefore essential that anyone undertaking the treatment should carefully supervise all details, and not be satisfied to leave the responsibility of carrying it out entirely in the hands of a nurse.

We are dealing with an agent which affects the heart's action, both materially and rapidly, and it would be quite as unwise for a doctor to leave the question of the administration and dosage of digitalis to the discretion and judgment of a nurse, as for him to do likewise with a course of "Nauheim" baths. The great mistake which is made in England with regard to balneological treatment is the haphazard and casual way in which those who know nothing about it, from a practical point of view, prescribe it, or give advice against its use.

THE ADMINISTRATION OF THE BATHS.

Taking, for example, an average case of a dilated, irritable heart, a sequel of influenza, suffering from symptoms of vertigo, palpitation, dyspnœa, insomnia, cardiac pain, lassitude, and general invalidism, in which treatment by drugs and prolonged rest has been tried with no improvement, or only a temporary relief from chronic invalidism, a bath of three or four minutes' duration, at a temperature of 96° or

97° F., containing 6 to 7 pounds of Droitwich salt⁶ and 7 to 8 ounces of calcium chloride, is given. The pulse-rate and volume are carefully noted before, during, and after the bath, and the result aimed at, and usually obtained, is a diminution in frequency, an increase in volume, and a lowering of tension. The area of absolute cardiac dulness should be carefully percussed out and marked with a dermatographic pencil, and will in most cases be found to have decreased definitely after the bath. This indication of an improved tone of the cardiac muscle remains for some hours after the bath, and becomes more permanent and more marked as the course advances, till at the end of the first week's baths one may be fairly confident of finding a marked decrease of the area of absolute cardiac dulness *before* the bath—that is to say, twenty-four hours after the preceding one, in a case where cardiac dilatation is marked. This diminution continues throughout the course, and at the end of five weeks one is practically sure of getting a normal cardiac dulness, except in cases where the physical signs indicate definite hypertrophy, as well as dilatation. In these the increased area of dulness due to dilatation will disappear, but the increase due to hypertrophy will, of course, remain.

The patient goes to bed for one hour after the bath, and is not allowed to read, write, or talk during that period, the after-effect of the bath often inducing

⁶ Droitwich salt can be obtained from any salt merchant or chemist. If it is not obtainable common salt can be used.

a comfortable sleep. The more advanced cases are often kept in bed for the whole of the first week of treatment. The management of a case in this respect must depend entirely upon the condition of the patient. Those who are undergoing a course should go for a short walk or drive every day, if this can be done without over-fatigue or exhaustion.

The medical man should make a practice of being present during the first bath for the purpose of watching the pulse and the general effect upon the heart and circulation, as this is the only way in which he can properly regulate the baths so that the patient may receive the fullest benefit from them; it would also enable him to order the patient out if any sign of faintness should appear. I have, however, never had to curtail a bath for this reason.

In all cases it is advisable to watch the effect of the bath in this manner twice a week, as one is enabled thereby to regulate the course much more satisfactorily than if one had to depend for guidance entirely upon interviews *between* the times of the baths; indeed, it is the only really proper method of supervising a course.

When the doctor is present at the bath of a female patient a sheet is stretched across the bath, and is provided with four or five tape-loops to hang on to hooks fixed on the wall-side of the bath; this sheet the nurse adjusts after the patient is immersed.

A tightness and oppression of the chest is sometimes felt during the bath, and in some cases the

pulse-rate does not fall till twenty minutes or half an hour after, but in all cases a definite diminution of pulse-rate is produced.

If the pulse increases in rapidity during and after the bath on two or three successive occasions, it is practically always due to one of the following reasons: either the patient is having baths the strength, temperature, frequency, or duration of which do not suit; or he is not a suitable case for the treatment; or he has had as long a course as his constitution can undergo with benefit. The first of these three causes is the one that is found to be most often responsible for this undesirable symptom, which, however, rarely occurs from any cause.

Frequency of the Baths.—In an average case the baths are given five times in the week, leaving Wednesday and Sunday as rest days. It is never advisable to give more than three baths in succession without a day's interval. The number of baths given in a course varies from twenty to thirty, any greater number than the latter being likely to weaken the patient, and to decrease, rather than increase, the good that has been done. The average length of the course is from four to six weeks. In the case of a female patient the course extends over a period about a week longer than that of a male patient, if an interval has to be allowed for the menstrual period. In cases where there is a great deal of debility and cardiac dilatation, or the patient's strength has been worn down by frequent attacks of angina or a long and trying ill-

ness, baths given every other day, with a day of rest between each bath, are found to produce the best results, and are less likely to fatigue the patient.

Strength of the Baths. The first bath contains 6 to 7 pounds of Droitwich salt and 7 to 8 ounces of calcium chloride. The bath is so filled that the patient is immersed up to the neck, the quantity of water required for this purpose being about 45 gallons. If the bath is unusually large and more water than this is needed to fill it, a little more salt and calcium chloride must be added in proportion to the extra quantity of water used. A patient who suffers from dyspnoea when lying down should sit in the bath for the first few times; after four or five baths these cases have, usually, so improved that they are able to lie down without any discomfort.

If the circulatory system reacts well, the strength of the bath is increased by 1 pound of sodium chloride and 1 ounce of calcium chloride every second bath, up to the tenth or twelfth. To the tenth or twelfth bath is added one-half of a carbonated effervescing bath. If this addition proves satisfactory, the strength of the bath is raised by 1 pound of sodium chloride and 1 ounce of calcium chloride every second bath, as in the first instance; and the effervescence to three-quarters of a carbonated bath, at about the sixteenth, and an entire one at about the twentieth.

By the end of the course the patient is having a bath containing from 15 to 16 pounds of sodium

chloride, from 16 to 17 ounces of calcium chloride, and the whole of an effervescing bath.

There are certain classes of cases in which *effervescing* baths should *never* be given: those suffering from marked arterio-sclerosis with high blood-pressure are the most important of these. *Still* baths are very beneficial in these cases, but *effervescing* ones are distinctly harmful. The details of the baths with reference to special cases will be entered into in the chapters dealing with them.

Duration of Immersion.—The length of the first bath is from three to four minutes, in an average case, and the time should be lengthened by one minute every second bath. Some patients, especially those who are taking a second course, can begin with baths of five to six or even seven minutes' duration, and rise to seventeen or eighteen towards the end of the treatment, but it is unwise to give such baths to patients whom one has not treated before, and of whose powers of circulatory reaction one has not obtained a previous knowledge.

Temperature of the Baths.—The first bath is given at a temperature of 96° to 97° F., this temperature being lowered 1° F. every second bath down to 93° F., or even lower, in exceptional cases. In many cases a good reaction cannot be obtained if the temperature of the bath is below 95° F.

As the water cools less rapidly in hot weather, the patient can with advantage take a bath of lower temperature then than when it is cold, and an effer-

vescing bath may be prescribed at a lower temperature than a still one, without the patient feeling cold and without interfering with the circulatory reaction.

Unless the weather is very hot the patient has a hot-water bottle in bed after the bath; and under these circumstances, if he does not remain comfortably warm, the temperature of the bath should be raised.

It is a noteworthy fact, and one that points to a much improved circulation, that a bath which would produce coldness and cyanosis of the extremities at the commencement of a course is usually productive of a sense of warmth and comfort, and a marked improvement of colour, towards the end of the treatment.

Some patients, especially those of a nervous temperament, suffer from marked rigors after the bath. These manifestations are rare, and when they do occur are not indicative of cold, as the extremities remain warm and of good colour; they are usually found to indicate that either the length or the strength of the bath given is not suitable, or that the patient has had as many baths as can be taken with advantage.

There are, however, some patients who experience these rigors from the first, but in these cases the rigors are usually slight, tend to decrease at each successive bath, and are not of any serious import.

Carbonated Effervescing Baths.—There is a widespread belief, not confined to the general public, but also amongst the medical profession, that a

" Nauheim " bath is essentially a *carbonated effervescing* bath, and it is due to this belief that the " Nauheim " treatment is often given absolutely wrongly, and naturally produces unsatisfactory, and sometimes alarming, results. It cannot be too strongly urged upon those who use this treatment, that they cannot make a worse mistake than by giving a carbonated effervescing bath in the first instance, and that if they do this they court failure, and bring undeserved disrepute upon a treatment which, when given carefully and properly, has never done a single case any harm, and has not only restored many thousands from chronic illness to good health and enjoyment of life, but has prolonged life and relieved great suffering in many serious cases. In my experience the majority of nurses, both male and female, who profess to understand the " Nauheim " treatment, have been taught to start at the wrong end, and begin with *carbonated effervescing* baths instead of *still* baths. It is therefore of great importance that the medical man himself should supervise the baths, and never leave their administration entirely in the hands of a nurse. I do not offer any excuse for emphasizing the above point, both in this chapter as well as in the Introduction to this book, as I do not believe it can be brought too forcibly under the notice of those who propose to use the " Nauheim " treatment, as it is one of the primary rules that must be adhered to if successful results are to be obtained.

General Treatment.—The general care of a case during treatment is of great importance. No definite rules can be laid down that would be suitable to all, but it is essential in every case that the patient should absolutely give up business and social engagements, and have the digestion and bowels well attended to. When the patient is well enough to be about, a prescribed amount of walking exercise should be taken every day.

That these general directions, carefully carried out, help to a satisfactory result is manifest, but that they are not in themselves enough to produce that result, is evident from the fact that most of my cases have been more or less chronic invalids for long periods, and have been treated with drugs, rest-cures, massage, and other methods, but have failed to obtain relief as rapid, satisfactory, or lasting as that resulting from a course of baths and exercises.

Three weeks to a month's change of air after a course of baths materially increases the benefit obtained, and should be taken in every case. It is not, however, possible to lay down any universal rule as to the place best suited to the patient; age, extent, and kind of the disease, personal idiosyncrasies, and the season of the year, must guide one greatly in the choice of a locality.

CHAPTER II

ARTERIO-SCLEROSIS AND HIGH BLOOD-PRESSURE (HYPERPIESIS)

THE consideration of the treatment of arterio-sclerosis and high blood-pressure by the "Nauheim" methods is of the greatest importance; firstly, because these conditions are gradually assuming a more and more important place in the category of those diseases which produce a premature old age, and are responsible for an ever-increasing percentage of deaths, especially amongst the middle-aged; and, secondly, because the "Nauheim" treatment is undoubtedly the best treatment for these conditions, cases of hyperpiesia being amongst those which yield most excellent results under this régime, those of the pre-sclerotic type being entirely curable, and those of the sclerotic being very greatly benefited, even when arterial degeneration is well established; to such an extent, indeed, that many years of health and comfort are added to lives which would otherwise have shortly ended in a period of chronic invalidism. No treatment by drugs, electricity, or dietary, is so certain of success or so lasting in effect in this class of case.

The word "hyperpiesia" will hence be used as synonymous and alternative to hypertension, to signify conditions of high blood-pressure, both of the

pre-sclerotic and sclerotic types. It is a useful appellation for this definite pathological condition, and was introduced into medical literature by Clifford Allbutt in his work on diseases of the arteries, in which he says:⁷ "I was enabled . . . to satisfy myself that a certain process may, and often does, arise without the intercurrent or sequel of the events known to the clinical physician as chronic renal disease, in any of its forms, but it is significant of another and different clinical series, though one ultimately damaging the heart and arteries in like manner, and no less irreparably. This alternative clinical series I named at first 'senile plethora,' but the malady being not one of senility, I suggested the alternative name of 'hyperpiesia.' " The following table (Table I.) of a series of consecutive cases exhibiting high blood-pressure,⁸ treated by the usual methods, shows the rapidly increasing percentage of deaths as the blood-pressure rises. The percentage of deaths in each class can be compared with that of one hundred cases, treated by the "Nauheim" methods, taken alphabetically from my case books (Table II.).

The first division of Table I. cannot be compared with the first of Table II., as it contains cases with blood-pressure from 141 mm. upwards, whereas the lowest blood-pressure in Table II. is 150 mm.

⁷ "Diseases of the Arteries including Angina," vol. i., p. 313. Clifford Allbutt.

⁸ F. de Havilland Hall. *Lancet*, May 25, 1912.

N.B.—Dr. de Havilland Hall informs me that few, if any, of these cases were treated by "Nauheim" methods.

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TABLE I.

CASES NOT TREATED BY "NAUHEIM" METHODS.

	No. of Cases	No. of Deaths	Percentage of Deaths.
1. Cases with arterial pressure of 141 mm. to 160 mm.	34	1	2.9
2. Cases with arterial pressure of 161 mm. to 180 mm.	19	5	26.3
3. Cases with arterial pressure of 180 mm. to 200 mm.	12	5	41.2
4. Cases with arterial pressure of over 200 mm.	17	9	52.9

TABLE II.

CASES TREATED BY "NAUHEIM" METHODS.

	No. of Cases.	No. of Deaths.	Percentage of Deaths.
1. Cases of arterial pressure of 150 mm. to 160 mm.	24	2	8.3
2. Cases of arterial pressure of 161 mm. to 180 mm.	36	4	11.1
3. Cases of arterial pressure of 181 mm. to 200 mm.	10	2	20.0
4. Cases of arterial pressure of over 200 mm.	30	9	30.0

The comparative results of cases in divisions 2, 3, and 4, of Tables I. and II., are shown below:

TABLE I.

1. Nineteen out of forty-eight cases died—39.5 per cent.
2. None of these lived over two years.
3. In two out of the nineteen the cause of death was unconnected with hyperpiesia.
4. Seventeen out of forty-eight died of causes connected with hyperpiesia within two years.

TABLE II.

1. Fifteen out of seventy-seven cases died—19.4 per cent.
2. The average duration of life of the fifteen who died was four years.
3. In three out of the fifteen, the cause of death was unconnected with hyperpiesia.
4. Twelve out of seventy-seven died of causes connected with hyperpiesia within seven years.

In Table II., of the twelve cases which died of causes due to hyperpiesia, six were in the last stage of the disease when I saw them, and the treatment was only tried, as a last chance, a few months before they died. Many patients could be restored to health if "Nauheim" treatment was not left as a final resource towards the end.

From the above comparison the great advantage of this treatment, in cases of hyperpiesia, is clearly proved; as it is shown that the percentage of deaths is very greatly reduced, and that life is materially lengthened, even in advanced cases, provided that they are treated in time.

The seriousness and rapidly increasing development of diseases of this class is pointed out by A. E. Shipley,⁹ who states that deaths due to chronic heart disease, arterial disease, and renal disease, all show considerable relative and absolute increment in the last few decades. In 1912 the death-rate from these diseases, in persons aged forty-five and more, had increased from 100 to 300 per cent., as compared with the death-rate of these ages in 1868.

The late Theodore Janeway,¹⁰ in his Shattock Lectures, in discussing diseases of the circulatory system, pointed out the great increase in the death-rate from these diseases in New York City during the decade 1900 to 1910: deaths from cerebral

⁹ *Bulletin of Department of Health of New York.* A. E. Shipley.

¹⁰ *Boston Medical and Surgical Journal.*

hæmorrhage had risen 18·8 per cent.; from organic disease of the heart, 39·3 per cent.; *from diseases of the arteries, 396·2 per cent.* In face of statistics such as these one cannot doubt that death from diseases of the vessels is increasing at a most alarmingly rapid pace.

The above references are taken from American authorities, as it is in America that most of the statistical work on this subject has been carried out; but no physician of any experience can fail to realize that a similar increase of these cases is existent in England. There are several causes to account for this; the most important amongst them being: the increasing difficulty of earning a living, the succeeding epidemics of influenza, and the sequel of the anxieties, overstrain, and overwork of the late war, when men of advancing middle-age were called upon to do more than the normal work of much younger and stronger men, at a time when they should rightly have been considering the cessation, or at least an easing-off, of work and business worries, if they wished to avoid hyperpiesia; and the younger men were tried by severer physical hardships and greater responsibilities than any former generation had endured. The aftermath of such an upheaval will undoubtedly bear fruit for many years to come.

My object is to prove, both by statistics of cases treated and by examples of those cases, that the "Nauheim" treatment, by lowering the blood-pressure, toning up the cardiac muscle, and strengthen-

ing the heart's action, so improves the circulation that it not only eliminates toxic poisons, which cause hyperpiesia, from the system, but that by so doing it retards the process of degeneration even in advanced cases, and restores the vessels to a healthy condition in the earlier ones.

The very great importance of an improved circulation and healthy cardiac action, thereby producing a more normal excretion and secretion whereby deleterious waste products can be rapidly voided from the system, is urged by all authorities on the subject, and they are almost entirely unanimous in agreeing that the sequence of events in the production of arterio-sclerosis is:

1. The presence of a toxin in the system.
2. The causation of hypertension by this toxin.
3. The production of arterio-sclerosis by prolonged hypertension.

Huchard¹¹ was of opinion that where high tension and arterio-sclerosis were present, the association was invariably—high tension first, arterio-sclerosis second.

Thayer and Brush¹² state that the main etiological factor in the development of hyperplastic thickening, which constitutes so important an element in arterio-sclerosis, is overstrain of the vascular walls from continued or intermittent high tension.

Faught¹³ states that toxins which are directly responsible for the rise in blood-pressure, at the same

¹¹ "Diseases of the Arteries." Clifford Allbutt, vol. i., p. 378.

¹² "Blood-Pressure." Faught, p. 400.

¹³ *Ibid.*, p. 285.

time exert an injurious effect upon the arterial walls, and that after a time the persistent hypertension causes general arterio-capillary sclerosis.

F. A. Willius¹⁴ is of opinion that three factors probably are responsible for the myocardial changes accompanying hypertension: (1) The cause or causes primarily responsible for the constitutional disorder; (2) the action on the myocardium of the retention products, or of the intermediate products of incomplete metabolism, or toxic agents resulting from imperfect renal or tissue functions; and (3) the increased cardiac work, affecting largely the myocardium, resulting from the hypertension *per se*, and the alteration in cardio-vascular balance.

Huchard¹⁵ has constantly pointed out that the treatment of arterial hypertension resolves itself into treatment of organic intoxication by decreasing the supply of toxin with an appropriate dietary régime, and by facilitating the removal of endogenous toxins by stimulation of the normal functions of intestinal, renal, and cutaneous elimination. He lays great stress on massage and baths for counteracting hypertension.

It is very evident from the opinions of all these authorities that what is wanted to combat hyperpiesia is a treatment which lowers blood-pressure, strengthens the heart's action, and improves the entire circulation; and this we undoubtedly have in its most efficient form in the "Nauheim" methods.

¹⁴ "Clinical Electrocardiography." F. A. Willius.

¹⁵ "La Médication Hypotensive." Huchard.

Many of the painful and dangerous symptoms which are usually regarded as directly due to hypertension, are in reality the result of cardiac inadequacy and dilatation, consequent upon that hypertension. If the heart is called upon to work at high pressure for a long period it will first show signs of fatigue and then failure; this failure occurs when the dilatation, which is the result of unchanging inflow and gradually failing outflow, proceeds to such an extent that the tension of the muscular fibres is unable to cope with the increasing intracardial pressure.

The following tables, Nos. III., IV., V., and VI., show in detail the effect of the treatment upon the first hundred cases of hypertension and arteriosclerosis taken alphabetically from my case books. The hundred cases are divided into four groups, according to the amount of hypertension, and the separate columns give the details of each case, including the minimum and maximum blood-pressures, before and after treatment. All these cases were in bad health before treatment, and a large number of them were seriously and dangerously ill. Table III. gives the cases with a maximum blood-pressure between 150 and 160 mm. before treatment. These cases, twenty-four in number, are all examples of pre-sclerotic hypertension; all were suffering from more or less dilated flabby hearts: two had serious valvular disease (Nos. 6, 13), either mitral or aortic; one had auricular fibrillation and valvular disease (No. 17), both of long standing; one (No. 16) had diabetes;

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one (No. 4) had advanced Graves' disease; one (No. 12) had been a heavy drinker.

TABLE III.

SHOWING RESULT OF TREATMENT IN CASES WITH MAXIMUM BLOOD-PRESSURE, 150 TO 160 MM.

No. of Case.	No. of Courses.	Age.	Under Observation.	Present Health.	Blood-Pressure before Treatment.	Blood-Pressure after Treatment.
		Years.	Years.		Mm. Hg.	Mm. Hg.
1	1	60	7	Good	80-150	80-120
2	2	68	6	Good	90-155	80-135
3	1	46	8	Good	100-150	80-115
4	1	23	2	Fair	30-155	60-125
5	1	22	4	Good	90-150	65-120
6	1	27	4	Good	80-155	70-125
7	1	53	2	Good	90-155	80-145
8	1	52	6	Fair	100-155	80-130
9	6	80	12	Good	70-160	60-150
10	1	54	2	Fair	95-160	80-120
11	1	58	$\frac{1}{2}$	Good	80-150	80-140
12	2	50	3	Good	90-150	100-140
13	1	43	2	Good	80-150	75-116
14	2	35	3	Good	100-155	80-135
15	1	55	4	Good	100-150	80-130
16	1	47	2	Good	110-150	95-130
17	1	63	2	Died	90-150	80-123
18	2	45	5	Fair	40-160	50-160
19	1	47	$\frac{1}{2}$	Fair	85-160	70-130
20	2	70	5	Good	90-160	85-135
21	1	67	7	Good	95-150	80-140
22	1	35	3	Fair	80-150	65-118
23	1	64	$\frac{1}{2}$	Died	80-160	80-138
24	2	56	13	Good	70-155	80-145

Of the two cases who died, No. 17 died of diabetes and No. 23 of heart failure, due to specific myocardial degeneration. From the above table it will be seen that in all the cases except one, the maximum blood-pressure was markedly lowered by treatment; in that one, No. 18, the patient was suffering from mitral

and aortic regurgitation with much left ventricular hypertrophy.

With reference to the effect upon minimum pressures, practically all those that were above the normal were reduced. In Case No. 4, one of advanced Graves' disease, the minimum pressure, which was, as it usually is in these cases, very much below the normal, was raised 30 points, and was thereby much more nearly approximated to the normal. In Case No. 18, one of aortic and mitral regurgitation, the minimum blood-pressure was also improved.

The great importance of the minimum blood-pressure, from the standpoints of diagnosis, prognosis, and treatment, will be discussed later.

For the purpose of making observations on blood-pressure, a Martin's mercurial sphygmomanometer with an armlet, was used for the maximum readings, in combination with the late Dr. George Oliver's tampon and stethoscope for the minimum readings. The mercurial sphygmomanometer is more accurate and less likely to get out of order than any other form of instrument, and no instrument without an armlet gives reliable reading. The terms "*maximum*" and "*minimum*" blood-pressure have been used in preference to "systolic" and "diastolic," because I do not believe that these two readings have any close relationship to the systole and diastole of the heart.

The *maximum blood-pressure* is indicated by the reading on the sphygmomanometer at the instant when

the bruit heard on the stethoscope, connected with the tampon, ceases; it coincides with the moment at which the lumen of the brachial artery is entirely closed by the pressure of the armlet.

The *minimum blood-pressure* is indicated by the reading on the sphygmomanometer at the instant when a faint bruit is first heard on the stethoscope connected with the tampon; it coincides with the moment when the pressure of the armlet *begins* to flatten the circumference of the brachial artery.

No method of ascertaining the maximum and minimum blood-pressures is so accurate and delicate as the auditory method.

Table No. IV. contains the details of the result of treatment in the thirty-six cases out of the hundred, Nos. 25 to 60 inclusive, in which the maximum blood-pressure was between 161 and 180 mm.

Of the four cases which died, No. 39 died of acute septic poisoning from a tooth, and No. 58 fell downstairs and broke her neck; No. 38 died of angina six years after treatment, the fatal attack being due to over-indulgence; and No. 60 also died of angina six years after treatment. In this case a further course had been urged six months before death, but as the pain was only slight then, the patient did not realize the seriousness of the condition and decided not to have treatment. I have never known a case of death from angina in which there was not also cardiac dilatation; if this condition is cured I believe the patient is free from the danger of sudden death.

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In nearly all the above cases the effect of the treatment was to materially reduce hypertension for a lengthy period, and the percentage of deaths was

TABLE IV.

SHOWING RESULTS OF TREATMENT IN CASES WITH MAXIMUM
BLOOD-PRESSURE, 161 TO 180 MM.

No. of Cases	No. of Courses	Age.	Under Observation	Present Health.	Blood-Pressure before Treatment.	Blood-Pressure after Treatment.
		Years.	Years.		Mm. Hg.	Mm. Hg.
25	1	53	2	Good	70-165	85-135
26	1	59	2	Good	110-180	90-150
27	3	66	5	Good	100-175	95-135
28	1	47	2	Good	115-170	70-125
29	2	52	2	Fair	110-180	95-175
30	2	63	15	Good	85-175	75-112
31	2	33	3	Fair	90-170	85-124
32	2	55	3	Fair	100-180	95-170
33	3	64	4	Good	90-180	100-150
34	1	71	2	Fair	90-180	95-185
35	5	60	25	Good	90-175	80-150
36	2	67	10	Poor	90-165	80-122
37	1	71	2	Good	100-175	70-115
38	2	58	7	Died	80-175	95-170
39	3	65	3	Died	120-170	95-155
40	3	59	6	Fair	120-170	90-140
41	3	61	4	Fair	100-175	75-125
42	2	48	6	Good	80-175	85-135
43	1	61	2	Good	100-175	80-170
44	3	74	6	Good	80-170	80-140
45	1	51	6	Good	80-170	75-130
46	1	65	5	Fair	70-180	60-130
47	4	60	6	Good	90-175	75-130
48	1	41	$\frac{1}{2}$	Fair	90-170	90-114
49	1	60	1	Good	110-180	80-150
50	1	64	2	Good	100-180	80-130
51	1	65	1	Poor	100-170	100-145
52	2	49	6	Good	100-175	105-140
53	1	21	4	Good	70-180	60-120
54	1	63	3	Good	70-165	90-125
55	2	70	13	Good	100-165	90-125
56	1	60	6	Good	80-170	70-125
57	1	70	3	Fair	100-175	80-135
58	1	64	1	Died	100-170	70-155
59	1	67	4	Good	90-170	85-145
60	2	70	6	Died	100-165	80-122

considerably less than half that of division 2, Table I. The two patients who died of cardio-vascular trouble lived more than six years after treatment.

TABLE V.
SHOWING RESULTS OF TREATMENT IN CASES WITH MAXIMUM
BLOOD-PRESSURE, 181 TO 200 MM.

No. of Cases.	No. of Courses.	Age.	Under Observation.	Present Health.	Blood-Pressure before Treatment.	Blood-Pressure after Treatment.
		Years.	Years.		Mm. Hg	Mm. Hg.
61	1	49	4	Good	120-190	90-150
62	2	90	6	Good	90-200	80-170
63	2	61	4	Good	100-200	98-150
64	1	71	2	Good	100-190	80-160
65	1	40	3	Fair	105-200	85-170
66	3	68	3	Fair	100-200	105-175
67	1	76	$\frac{3}{4}$	Died	105-200	118-185
68	1	52	4	Died	120-200	100-190
69	1	37	3	Good	90-190	90-150
70	2	55	7	Fair	110-185	80-155

Of the two cases that died, No. 67 died of cardiac failure, due to long-standing asthma, bronchitis, and emphysema. He only had treatment nine months before he died, and it was then only tried as a last resource, as he was very seriously ill at the time; his condition improved for a few months, but a fresh chill and attack of bronchitis killed him. No. 68 died of cerebral hemorrhage seven years after treatment. In all these cases the hypertension was materially reduced by treatment for a long period, and the percentage of deaths was less than half that of the corresponding division (division 3), Table I. It will be noted that in most of the cases the minimum pressure was reduced as well as the maximum; in the two cases

in which this did not occur, No. 66 had severe mitral regurgitation with accompanying great hypertrophy of the left ventricle, and No. 67 died a few months after treatment. None of the cases in Tables III., IV., or V. presented uræmic symptoms, and none of the deaths in these tables were due to kidney affections.

TABLE VI.

SHOWING RESULTS OF TREATMENT IN CASES WITH MAXIMUM BLOOD-PRESSURE, OVER 200 MM.

No. of Cases.	No. of Courses.	Age.	Under Observation.	Present Health.	Blood-Pressure before Treatment.	Blood-Pressure after Treatment.
		Years.	Years.		Mm. Hg.	Mm. Hg.
71	3	70	5	Poor	110-220	80-160
72	1	56	$\frac{1}{8}$	Died	170-270	136-200
73	1	60	1	Good	100-220	90-172
74	2	51	2	Poor	130-230	110-250
75	1	67	1	Poor	110-260	100-250
76	1	71	$\frac{1}{2}$	Died	160-270	120-245
77	1	50	2	Died	170-290	115-220
78	1	61	2	Fair	140-225	110-220
79	1	52	2	Poor	140-245	120-220
80	1	63	4	Good	110-240	110-220
81	1	63	$\frac{1}{4}$	Poor	140-280	133-240
82	3	64	3	Fair	100-240	100-170
83	1	60	3	Fair	100-210	100-185
84	3	78	4	Fair	140-230	90-140
85	1	34	1	Poor	115-230	120-220
86	1	65	3	Poor	140-215	100-165
87	3	64	5	Fair	110-210	110-175
88	1	56	2	Fair	90-230	95-195
89	1	49	1	Fair	160-260	130-220
90	1	50	3	Poor	120-230	80-150
91	1	68	3	Poor	160-290	120-230
92	1	70	$\frac{1}{3}$	Fair	120-220	80-190
93	2	74	3	Good	120-220	90-190
94	1	59	$\frac{1}{3}$	Died	140-360	160-240
95	2	76	7	Good	110-230	75-165
96	1	60	$\frac{1}{2}$	Died	170-320	140-230
97	1	50	3	Died	160-270	105-200
98	1	50	6	Died	160-230	90-225
99	1	67	3	Died	110-250	90-150
100	2	78	6	Died	120-300	90-190

All the cases in Table VI. were seriously ill before starting treatment; they all had a maximum pressure a good deal above 200 mm., and, except in three instances, a markedly raised minimum pressure, indicating advanced arterio-sclerosis. Of the nine deaths, six were due to cerebral hæmorrhage, two to angina, and one to cardiac failure. Four out of the nine who died from cerebral hæmorrhage (Nos. 72, 76, 94, and 96) consulted me less than six months before their decease, and were then very dangerously ill, and only had treatment as a last hope of lengthening life. All the thirty cases had advanced to that stage of hyperpiesia where cure is impossible, yet even under these circumstances twenty-two out of the thirty cases are now enjoying fair health, some of them several years after treatment. This is a highly satisfactory result to have been obtained in advanced cases, but there is no doubt that if these patients had taken treatment earlier they could have been restored to good health, and the disease would have been checked in a much less developed and probably entirely curable stage. In nearly all the above cases the hypertension was considerably reduced for a long period, and the percentage of deaths was not far short of half that of division 3, Table I. The above tables demonstrate conclusively the advantage of the "Nauheim" treatment over other methods, even in advanced cases of hyperpiesia.

Twenty-four out of the hundred cases were not ones of uncomplicated hyperpiesia: nineteen had severe

valvular disease, three advanced Graves' disease, and two well-established diabetes, with about 20 grains of sugar to the ounce of urine; and the entire hundred had more or less cardiac dilatation. Hyperpiesia being a pathological condition which is caused by various toxins, such as those present in rheumatism, gout, influenza, typhoid, malaria, dysentery, mental and physical overstrain, etc., it is only natural that it should often exist concurrently with other diseases.

Hyperpiesia does not necessarily affect all persons of advancing age; many people between the ages of fifty and seventy have soft elastic arteries and a normal blood-pressure; but there is no doubt that as age advances the tendency to hypertension and arterio-sclerosis increases, and no individual who has not led a careful and abstemious life with regard to eating, drinking, and taking exercise, is at all likely to be free from it after middle age, even if he has not suffered from one of the many complaints of which it is often a sequel. Some of the worst cases are those of middle-aged leisured people who, though strictly temperate as regards alcohol, have always been heavy eaters and taken little or no exercise. There is little doubt that excess in eating kills more people prematurely than does excess in drinking, and the only reason it is not looked upon by the ordinary individual as a vice, is because it does no harm to anyone except the gourmand.

The difference in the effects of hypertension at varying ages is due to the fact that in older people

increased tension is generally the result of a slowly advancing arterio-sclerosis, and the heart gradually accustoms itself to the extra strain, and therefore steadily hypertrophies, though never to the extent of a heart in chronic nephritis, before it reaches the stage of fatigue and dilatation, and suddenly gives way; whereas when hypertension is present in the young it is practically always due to some comparatively rapid changes in the circulation setting up a state of irritability and contractility in the muscular and elastic walls of the vessels. Such a condition may be brought about by an attack of rheumatic fever, influenza, enteric, malaria, etc. The heart in these cases is suddenly called upon to bear a greatly increased strain, at a time when its muscular wall is probably weakened by myocarditis; and not having had time to hypertrophy, dilatation occurs, accompanied by its train of serious symptoms.

CLASSIFICATION OF CASES OF HYPERPIESIA.

The classification of cases of hyperpiesia is of the utmost importance from the standpoint of treatment, because physicians differ very widely in their opinions as to what is the best procedure in such cases, and this question can only be settled by a proper classification. Broadly speaking, there are two schools of thought with regard to this very important matter. The one argues that hypertension is only present when it is necessary to the maintenance of a more or less adequate circulation, and that any attempt to reduce

that hypertension, if successful, will leave the patient in a worse condition than formerly. The other maintains, that hypertension is a dangerous condition, which, if untreated, leads on to progressive arterio-sclerosis, and that it should therefore be reduced, even at the risk of materially lowering the vitality of the patient. If we regard every case of hypertension as identical, and only differing from its fellow in intensity, then we should find it difficult to argue against either of these teachings, because there is no doubt that any medical man with a large experience has seen instances in which the lowering of hypertension has done material good, and has apparently restored the patient to health and lengthened life; whereas he has also met examples in which a reduction, or even attempted reduction, of hypertension has done very definite harm.

Under such circumstances, one is not surprised to find that the practice of non-interference is often adopted, for fear that any well-intentioned treatment may only make matters worse. Such cases will then go slowly from bad to worse until they develop symptoms of cardiac failure, such as dyspnœa, cyanosis, and œdema; or suddenly end in a cerebral hæmorrhage, which their medical attendant has been expecting for some time past.

What is required, so that we may be able to deal with these cases in a more satisfactory and scientific manner, is some definite clinical classification of hypertension which will enable us to separate those

cases, in which reduction of tension by drug treatment will be safe and useful, from those in which it will only aggravate the symptoms. In order to arrive at this result, it is necessary to realize the very intimate connection between the heart and the bloodvessels, and always to keep before us the fact that a raised tension cannot exist for long in the vessels without having a definite effect upon the heart, the result of this effect differing widely according to the condition of the muscular tissue of that organ, and the amount of reserve power it has to fall back upon. This would seem a truism too self-evident to need emphasis, were it not for the fact that, in most works which deal specially with cardiac disease, the condition of the vessels receives but scant attention, and in those dealing with diseases of the vessels, their intimate connection with heart affection is not sufficiently demonstrated.

In investigating a case of heart affection, the condition of the vessels and the degree of arterial tension should be carefully noted; and in the study of a case of hypertension, a thorough examination of the heart is also necessary, if we wish to learn the cause of the symptoms and the best method of alleviating them. Several lengthy, scientific, and interesting books have been written on hypertension, but I have not read one in which a satisfactory clinical analysis of such cases is made, nor one in which the condition of the heart-muscle is sufficiently taken into account in the discussion of treatment.

The following is a classification of cases of hyperpiesia, not from a laboratory or experimental standpoint, but from a purely clinical one, by the aid of which it may be possible to label and classify each case for the purpose of treatment, so far as our present knowledge of the subject permits.

Cases of hyperpiesia may be clinically divided into the following four classes:

Class I.—Cases of *pre-sclerotic* hypertension in which the heart is *not* dilated and has *not* given way under the unusual strain.

Class II.—Cases of *sclerotic* hypertension in which the heart has *not* given way under the unusual strain.

Class III.—Cases of *pre-sclerotic* hypertension in which the heart *has* given way under the unusual strain and is therefore more or less dilated.

Class IV.—Cases of *sclerotic* hypertension in which the heart *has* given way and is more or less dilated.

There are four definite and materially different clinical pictures presented by these four groups, and treatment which would be advantageous in one would be harmful in another; it is, therefore, of the first importance to classify any special case in its own group before the line of treatment is decided upon. In order to do this, the following points must be carefully noted:

- (a) The rate, rhythm, volume, and tension of the pulse. If there is decided irregularity of rhythm or volume, a polygram or electrocardiogram should be taken.
- (b) The general condition of the vessels with regard to tortuosity and sclerosis.
- (c) The force and character of the cardiac impulse and the position and character of the apex-beat.
- (d) The area of cardiac dulness.
- (e) The character of the cardiac sounds.
- (f) The maximum and minimum blood-pressure records.
- (g) The general condition of all other organs and of the urine.

With this data to work on, and with no less, one can easily classify any special case of hypertension and treat it to the best advantage.

Class I.—*Cases of pre-sclerotic hypertension in which the heart is not dilated and has not given way under the unusual strain*, are usually found in young people, or those below middle age, who have suffered from some acute febrile attack, such as scarlet fever, measles, mild rheumatic fever, influenza, etc.; or have undergone great strain, mental or physical, such as so many of our young men had to go through during the Great War of 1914-1918; or those who have suffered from some form of toxic poisoning, such as an attack of boils.

The pulse is usually rather rapid and often exhibits sinus arrhythmia; its rate is easily affected, accelerating sometimes as many as thirty beats per minute, in a change from the sitting to the erect position, and its volume is usually small. The vessels do not feel thickened although the tension is increased. The cardiac impulse is somewhat forcible, but the apex-beat is in its normal position. The area of absolute cardiac dulness does not extend beyond the left border of the sternum, to the right, and is well within the left nipple line, on the left. Both heart sounds are usually somewhat exaggerated, and the first is often impure. The minimum blood-pressure, as ascertained by Oliver's phonendoscope, is not abnormally high, seldom being above 90 mm. The maximum blood-pressure seldom exceeds 160 mm., or 170 at the most. The other organs of the body are in fairly healthy condition, and the urine is usually normal.

The usual symptoms in this group are palpitation, rapid exhaustion on exertion, and sometimes headache, insomnia, dyspepsia, and nervousness.

Class II.—*Cases of sclerotic hypertension in which the heart has not given way under the unusual strain,* are usually found in persons approaching or past middle age, though, in exceptional cases, sclerosis of the vessels may set in earlier. Amongst the principal causes in this group are: rheumatism, gout, syphilis, overwork and overstrain, overeating, excessive drinking, and neglect of exercise. Cases

of Class I. may degenerate into Class II., if they are not properly treated when symptoms first arise, as also may Class II. into Class IV. Class III., however, if not treated on the right lines, would seldom live long enough to develop arterio-sclerosis. In Class II. the pulse is, as a rule, a little faster than normal, but not greatly so, and it does not vary much in different postures. The vessels feel hard and are often somewhat tortuous. There is no definite characteristic in the cardiac impulse, but it is more often slightly increased in force than not. The apex-beat is usually in the normal position. The character of the heart sounds varies; the first sound at the apex is sometimes increased in force, as is also the second aortic; this is not always the case, but in this group of cases the heart sounds are never feeble. The minimum blood-pressure is usually above 100 mm., and may rise to 120 or 140. The maximum blood-pressure often approaches or exceeds 200.

The main point of difference in the blood-pressure records of this group as compared with those of Class I. is that in Class I. the minimum blood-pressure is rarely above 90, whereas in Class II. it is practically always above 100. So constant is this difference in the minimum blood-pressure records of these two groups, that it may be looked upon as a safe method of distinguishing them one from another, except in isolated cases. The general condition of the organs is congested, as instanced in the lungs, by chronic bronchial catarrh; the urine often contains a

trace of albumen, rarely a trace of sugar, and is usually normal or nearly normal in specific gravity.

The commonest symptoms are headache, throbbing in the ears and head, pain and fulness at the back of the neck, vertigo, insomnia, irritability, nervousness, dyspepsia, and an inability to concentrate on brain work of any sort, for more than a very short time, without fatigue. In the more advanced cases, lapses of memory, slight temporary paresis, temporary loss of speech, and, finally, hemiplegia, occur.

Class III.—Cases of pre-sclerotic hypertension in which the heart has given way under excessive strain, and is more or less dilated and enfeebled, differ in most essentials from the above. They are usually found, as in the case of Class I., in young people, or those below middle age, who have suffered from some febrile attack, such as: scarlet fever, measles, rheumatic fever, influenza, or some other toxæmia. Attacks of any of the above, or of chorea, in which the heart has suffered from myocarditis or endocarditis, and some permanent damage has been done to one or more of the valves or the muscular wall of the heart, are responsible for many of these cases.

The rate, rhythm, and volume of the pulse depend very largely upon the extent of the cardiac defect, and may vary from a pulse of fairly normal rate, rhythm, and volume, to a very rapid pulse which is irregular both in rhythm and volume, and exhibits constant premature auricular or ventricular contractions. The vessels do not feel thickened, although the

tension is raised. In cases in which there is no valvular disease, and, therefore, no decided hypertrophy, the impulse is either feeble or impalpable, as is also the apex-beat. This is the most usual condition to find in this group, and is due to the fact that the contractile power of the weakened and stretched cardiac muscle tissue is markedly decreased. The area of absolute cardiac dulness is always enlarged, extending, in advanced cases, from well beyond the right border of the sternum to one or more inches to the left of the left nipple, and sometimes measuring 7 or 8 inches across at the nipple level. If there is no valvular disease to complicate the case, the cardiac sounds are weak. The minimum blood-pressure is practically never above 100 mm., and the maximum may be up to or, in exceptional cases, exceed 200 mm. All the organs are in a more or less congested condition. The usual symptoms in this group are: headache, insomnia, irritability, nervousness, and dyspepsia, as in Class I., but the dilated condition of the heart is shown by decided dyspnœa, orthopnœa, more or less cyanosis of the lips, hands, and feet, attacks of vertigo and syncope, œdema of the lower extremities, a feeling of fulness in the chest, and sometimes cardiac pain on exertion, originating in the chest and radiating down the left arm.

Class IV.—Cases of sclerotic hypertension in which the heart has given way under the constant overstrain, are found amongst a similar group of patients to

those of Class II., and are resultant from the same causes. They constitute, in fact, a variety of Class II., in which the heart has given way before the vessels, and symptoms of cardiac failure manifest themselves before the vessels become so far degenerate as to rupture, and cause cerebral hæmorrhage. The pulse is usually small and somewhat over-rapid, and sometimes irregular in volume and rhythm, the irregularities usually being due to premature auricular or ventricular contractions. The vessels are thickened, and in some cases tortuous. The cardiac impulse and apex-beat are usually feeble, but any definite valvular trouble may alter the cardiac signs. The area of absolute cardiac dulness is enlarged, as in Class III. The minimum blood-pressure is practically always over 100 mm., and the maximum may be very high indeed. I have known it to attain 360 mm. The other organs of the body usually exhibit signs of congestion, and the urine often contains a cloud of albumen.

The outlines given of the various classes of hypertension are those of typical cases; many of the signs and symptoms may be slight or absent in the early stages, and any complication, such as some form of valvular disease, may mask or alter them. The important point to note with regard to the signs and symptoms is, that those of Class I. and II., in which the heart has not given way under the strain, are markedly different to those of Class III. and IV., in which the heart has given way, and that whereas in

the former they all tend towards hemiplegia and other conditions due to high tension and diseased and defective vessels, in the latter they terminate with dyspnœa, anasarca, and other manifestations of cardiac failure. It is therefore very clear that treatment which would benefit one class of case would do actual harm to another, and that it is impossible to deal properly and successfully with cases of hypertension and arterio-sclerosis until they have been definitely classified.

THE DIAGNOSTIC VALUE OF BLOOD-PRESSURE RECORDS.

The "Nauheim" baths are not only useful as a highly successful method of treating hyperpiesia, but their effect upon hypertension enables one to come to a definite conclusion as to whether a case is of the pre-sclerotic or sclerotic type, and to ascertain how far sclerosis has advanced in a borderland case. In the pre-sclerotic type, in which the raised tension is entirely due to spasm of the vessel walls, and the walls themselves are healthy, the blood-pressures, both maximum and minimum, will drop to or below normal during a bath, however high they were before it. The following is an example of the effect upon such a case (Table VII.).

Table VIII. is an example of the effect of a fairly long bath upon a case of fatty dilated heart, in which there was some, but not a great deal of, sclerosis.

TABLE VII.

					Blood-Pressure.	Pulse-Rate.
					Mm. Hg.	
Before immersion	..	..	..	..	90-140	64
2 minutes after immersion	..	..	..	..	70-130	68
4	"	"	..	..	70-110	64
8	"	"	..	..	75-115	60
11	"	"	..	..	65-120	60

TABLE VIII.

					Blood-Pressure.	Pulse Rate.
					Mm. Hg.	
Before immersion	..	..	..	..	132-190	84
2 minutes after immersion	..	..	..	..	90-140	100
4	"	"	..	..	80-130	96
6	"	"	..	..	86-135	96
8	"	"	..	..	85-135	92
10	"	"	..	..	88-132	88
12	"	"	..	..	88-135	84

In Table VIII. it will be noted that the pulse rose to 100 per minute during the first two minutes' immersion. This was due to the exceptionally rapid drop in the blood-pressures and the necessity to fill rapidly dilated vessels. Such a sudden dilatation could not have occurred in a markedly sclerotic case, as the vessels would not have been elastic enough to dilate so rapidly. In this case the drop was unusually sudden and great, but the patient did not show any sign of discomfort, and the colour was somewhat improved.

Table IX. is that of a case in which arterio-sclerosis was very advanced, and therefore, although

the immersion in the bath reduced the tension, it did not bring down the maximum or minimum pressures to normal. This fact in itself would show that marked arterio-sclerosis was present.

TABLE IX.

				Blood-Pressure-	Pulse-Rate.
				Mm. Hg.	
Before immersion	..	..	..	140-230	62
3 minutes after immersion	..	..	..	115-190	64
6 " "	..	..	..	114-188	66
7 " "	..	..	..	112-188	64

The drop in the maximum pressure, even in this case of advanced sclerotic hyperpiesia, was over 40 mm. Hg., and therefore the pulse was slightly quickened during the bath, in order to fill the dilated vessels. This patient's pulse had been 90 per minute before treatment, and the blood-pressure had been 160-290 mm. Hg. The bath recorded in Table IX. was the eleventh of the course.

Krehl says¹⁶ that "distinction between internal tension and arterial thickening may elude the most experienced," and Faught¹⁷ is of opinion that "even the most experienced have been unconsciously led into grave error by depending upon tactile sensations."

The method of gauging the percentage of tension due to spasm of the vessels, as distinguished from

¹⁶ "Die Erkrankungen des Herzmuskels," etc. Krehl.

¹⁷ "Blood-Pressure," p. 399. Faught.

that due to sclerosis, in any individual case, by recording the effect of a " Nauheim " bath upon that tension, is undoubtedly the surest and most delicate test that can be applied; and the information obtained from that source is of the very greatest value and help in laying down a rule of life and prescribing treatment for the patient, for in the section dealing with treatment it will be shown that drugs and methods which would do good in one class of case, would only be harmful in another.

TREATMENT OF THE FOUR CLASSES OF HYPERPIESIA.

Class I. —Rest from work, change of air, a healthy outdoor life, and a light diet, with sufficient physical exercise to stop short of fatigue, are often all that is required to restore early pre-sclerotic cases to health. It is important to search for and treat, any source of chronic toxic poisoning, such as tonsilitis, pyorrhœa, or intestinal trouble. In the case of enlarged tonsils, the removal with the guillotine is quite satisfactory and safe, and produces practically no constitutional disturbance; the plan of enucleating with the knife is unnecessarily severe, and sometimes causes very serious illness, or even endangers life. In pyorrhœa the promiscuous extraction of all the teeth is to be deprecated. In intestinal toxæmia, attention to the bowels, the administration of intestinal antiseptics, and, in some cases, the wearing of an abdominal support, often produce a satisfactory result.

Vaso-dilators are unnecessary and harmful in these cases, for they tend rather to lower the general health than to improve it. General tonics are sometimes useful, but as a rule a carefully ordered life and dietary, and the treatment of any special symptom as it arises, is all that is required to cut short this first stage on the road to arterio-sclerosis. A course of baths will undoubtedly help and hasten a cure, as it improves the circulation in all the organs; but cases of this class will often get perfectly well without the need of any special balneological treatment. As these patients are usually young, it is not difficult to get them to alter their whole mode of life if necessary, but if this is not requisite or possible, absolute rest from work for a time, a careful moderation of all things—work, play, food, drink, and tobacco—will often prevent a recurrence, or the degeneration into a later stage of the disease.

Class II.—These are the cases in which one or other of the drugs which are reputed to reduce blood-pressure are really useful. Their name is legion, and many of them are of little or no good, and it is often necessary to try one after another, for a drug which will produce a satisfactory result on the blood-pressure in one case, will only cause disagreeable symptoms in another. The possibility of a specific history should always be borne in mind, and even if it is not obtainable, no harm can be done in trying collosol iodine, which is much better tolerated than iodide of potassium. Many private patients will not

submit to a Wassermann reaction being taken, but in practically all cases in which a specific condition is the cause of the sclerosis, the iodine will be tolerated well and give good results, whereas, in those not due to syphilis, it will be badly tolerated and will produce no good result. The drugs which I have found most generally useful are iodide of sodium, collosol iodine, nitroglycerine, and bromide of potassium. Calcium lactate freshly prepared and given in 10-grain doses three times a day, is also exceedingly useful in some cases. Apart from drugs, one of the best and surest methods of treating these cases is by a course of baths. They should be given under careful medical supervision, and should never be lower in temperature than 94° F.; indeed, many of these cases do best when the temperature of the bath is 95° or 96° F. *Carbonated effervescing* baths should never be given to this class of case, but the *still* form of "Nauheim" bath is of great use in reducing the hypertension for a lengthy period.

Any toxic cause should be sought for and treated, the diet should be *very sparing*, and regular physical exercise, short of fatigue, should be taken every day. A tumbler of plain hot or spa water should be taken two or three times a day between meals, to clean the stomach and wash out the kidneys; the bowels should be carefully attended to, but the production of diarrhœa is unnecessary, and in some cases harmful. A diet from which all meat is eliminated seriously weakens the strength and deteriorates the general

condition, and, moreover, never produces a definite or maintained decrease in the blood-pressure. The best diet for a case of sclerotic hypertension is a *very sparing* mixed diet, and it should be pointed out that the less eaten the better, for nearly all patients of this class are in the habit of consistently over-eating; this habit being in many instances the cause of the disease. A little meat once a day does no harm, for if a patient is put upon an entirely vegetarian diet he will eat a great deal more than if he is allowed a little meat. No meal should consist of more than two courses, fluid should be taken after, not during, meals; well-cooked toast should be given instead of bread, and no alcohol should be allowed. Drinking after meals and taking toast instead of bread will automatically lessen the consumption of food, as toast is more easily tired of than bread.

Class III.—In these cases, in which the heart has given way under the excessive strain of hypertension, it is absolutely *wrong* and *harmful* to prescribe drugs which lower, or are reputed to lower, the blood-pressure; for they will undoubtedly weaken the already handicapped heart, whether they lower the tension or not, and the patient will get worse instead of improving. Buckholby's¹⁸ experimental researches on the pharmacology of iodines are of great interest in connection with this subject, because the effect of iodine upon the heart and circulation can be taken as a fair standard of the result of the administration

¹⁸ *Ugeskrift for Læger*. Copenhagen, January 24, 1918.

of all cardio-vascular depressants. This observer finds that iodides failed to cause any change in the blood-pressure or pulse-rate until the iodine content in the blood reached a very high point, when *the heart's action was depressed* and the blood-pressure dropped. Cardiac and general tonics should be given as a temporary means of relieving distressing and dangerous symptoms. Digitalis is not counter-indicated if the effect is carefully watched, and it is best tolerated in the form of Nativelle's digitalin granules. A course of "Nauheim" baths is the only certain method of curing cardiac dilatation and lowering hypertension. The general treatment and dietary will have to be varied to suit the individual cases. Those confined to bed or complicated with serious valvular trouble need special lines of treatment.

Class IV.—As in the case of Class III., cardiac depressants are strongly counter-indicated in this group. Cardiac and general tonics must be administered with great care, especially in those cases where arterio-sclerosis is advanced. The general line of treatment as outlined for Class II. should be followed, and a carefully administered course of "Nauheim" baths is the only satisfactory treatment, and will produce most excellent results, if the case has not been allowed to go too far; as will be seen by reference to the tables of cases treated, and the typical examples of cases quoted. Symptoms must be dealt with as they arise, and each case will require its own modification of treatment.

EXAMPLES OF CASES TREATED.

No examples of cases of Classes I. and II. will be given, as those of Class I. very rarely require a course to cure them, and those of Class II. can generally be dealt with by the administration of drugs and a carefully regulated life and dietary.

The cases given in Classes III. and IV. have all been under observation for some time, the shortest being for three and a half years. They vary greatly from each other, in age, symptoms, and general condition, and therefore afford good examples to illustrate the wide field of use these methods cover, with regard to cases of hyperpiesia.

Two Examples of Class III.

CASE I.—A man, aged thirty-four years, was interned in Germany for nearly four years, where he only had a yard to exercise in, was half-starved during the last year of his internment, was only provided with German papers, the contents of which added greatly to his anxiety, and had to endure much privation in many other ways. Early in 1918 he had an attack of influenza, and after this he began to suffer from palpitation, exhaustion, and pain over the cardiac area. A German specialist who saw him at this time said he had a dilated and inflamed heart, but no treatment was given. When I first saw him at the end of 1918, he was very thin and looked drawn and ill, his hands were tremulous, and he was in

a highly nervous condition. His pulse was regular in time, of rather small volume, 80 per minute (Fig. 7).

His heart sounds were feeble, and a soft systolic murmur was heard at the apex. The apex-beat was just inside the nipple line, and the area of cardiac dulness was markedly enlarged, extending from the left nipple to $1\frac{1}{2}$ inches to the right of the middle line, and measuring $5\frac{1}{2}$ inches across at the nipple level (Fig. 8, *AA*). The urine was normal.

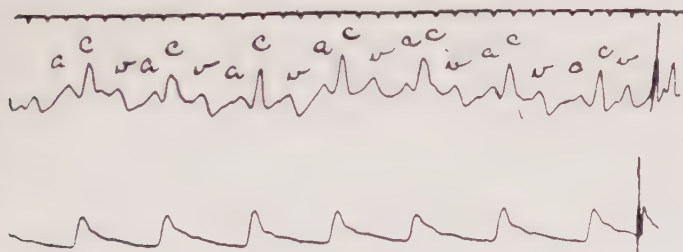


FIG. 7.—POLYGRAPHIC TRACING OF CASE I., BEFORE TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME, WITH NORMAL *a-c* INTERVAL.

His blood-pressure was 90-190 mm. Hg, and there was no indication of any thickening or hardening of the arterial walls. The case was a typical one of pre-sclerotic hyperpiesia, in which the heart had given way under the strain of influenza, privation, and anxiety. The patient improved steadily in health, and at the end of five weeks' treatment he had lost all disagreeable symptoms, could sleep well, had no palpitation or indigestion, no tremors or cardiac pain, and his nerves were quite steady. The area of cardiac

dulness was normal (Fig. 8, *BB*), measuring 2 inches across at the nipple level, as compared with $5\frac{1}{2}$ inches before treatment; the apex-beat was $1\frac{1}{4}$ inches inside the nipple line; the murmur, which was undoubtedly due to stretching of the mitral orifice from cardiac

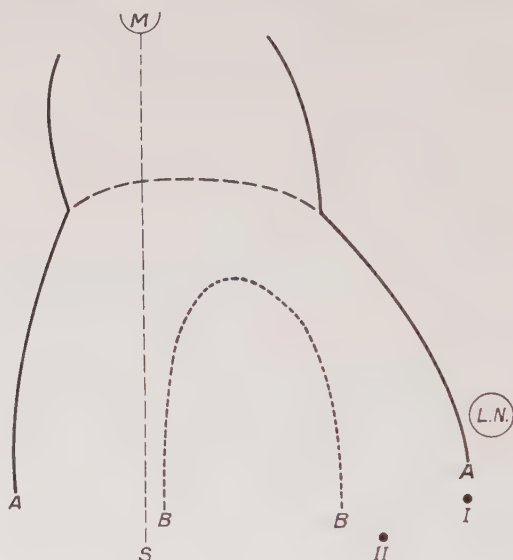


FIG. 8.

AA, area of absolute cardiac dulness of Case I. before treatment; *I*, apex-beat before treatment. *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat after treatment; *MS*, mid-sternal line; *LN*, left nipple.

dilatation, had disappeared, and his pulse was 60 per minute and of better volume. His blood-pressure was 90-130 mm. Hg. I heard from this patient three and a half years after treatment; he had been leading a busy and active life in the meantime. He

informed me that he got palpitation occasionally, but was otherwise well.

CASE II.—The patient, a man aged sixty-three years, who had lived a very arduous life as an engineer, and had worked for long periods at great altitudes in South America, began to have attacks of vertigo and syncope sixteen months before I saw him. These attacks were sometimes as frequent as eight to twelve times a day. They gradually increased in severity, and ultimately became so serious that he had to give up work. He saw two or three doctors, and was told that he had a dilated heart. When I first saw him he looked ill and was very thin, having lost over a stone and a half in weight; he suffered from insomnia and dyspepsia, and the attacks of vertigo were very frequent. His pulse was 65 per minute, quite regular both in time and volume, but the volume was very small, and a polygraphic tracing (Fig. 9) showed a marked increase in the *a-c* interval. The heart sounds were clear, but faint. The area of cardiac dulness was markedly enlarged, extending from the left nipple line on the left to the middle line on the right (*AA*, Fig. 10), and measured $4\frac{1}{2}$ inches across at the nipple level. The apex-beat was only just perceptible, and was $\frac{1}{2}$ inch inside the nipple line. The blood-pressure was 90-160 mm. Hg.

The patient had had both influenza and malaria, and was undoubtedly suffering from pre-sclerotic hyperpiesia, caused by overwork, exposure, and the illnesses he had gone through. These had weakened

his heart-muscle, and cardiac dilatation had supervened. As he had had treatment with drugs and rest for some time and, despite this, the attacks

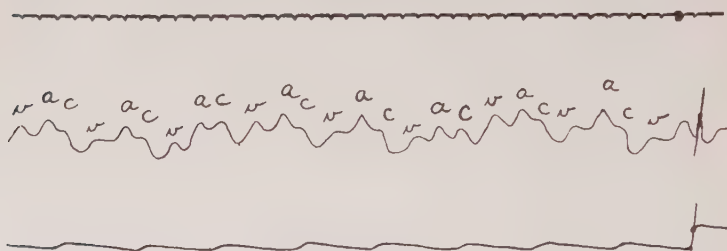


FIG. 9.—POLYGRAM OF CASE II., BEFORE TREATMENT, SHOWING A PULSE OF VERY SMALL VOLUME, 65 PER MINUTE, AND A LENGTHENED *a-c* INTERVAL.

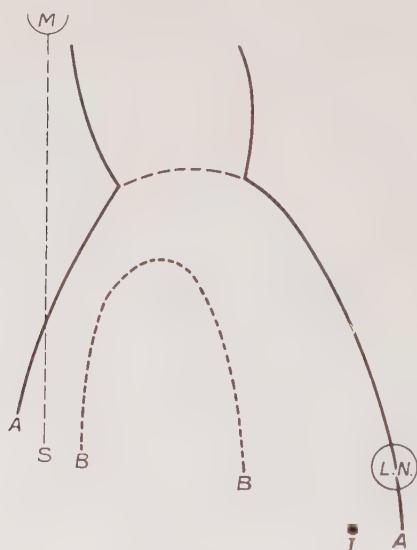


FIG. 10.

AA, area of absolute cardiac dulness of Case II. before treatment;
BB, area of absolute cardiac dulness after treatment;
LN, left nipple; *MS*, mid-sternal line; *I*, apex-beat.

continued, I advised a course of "Nauheim" baths, which he took in his flat in London. From this time forward he never had another attack, and at the end of five weeks' treatment his cardiac dulness was normal (Fig. 10, *BB*), measuring 2 inches across at the nipple level, as compared with $4\frac{1}{2}$ inches before treatment; his blood-pressure was 90-120 mm. Hg, the cardiac sounds were much clearer, his pulse was stronger in volume (62 per minute), the *a-c* interval was nearly normal (Fig. 11), and he was able to resume business.

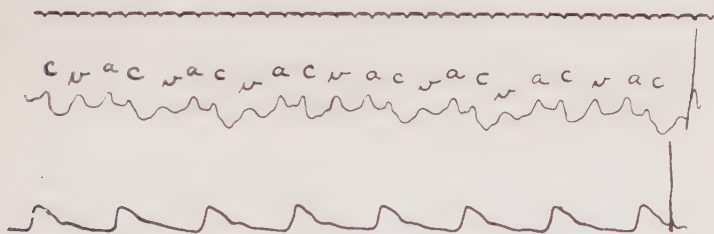


FIG. 11.—POLYGRAM OF CASE II., AFTER TREATMENT, SHOWING PULSE OF IMPROVED VOLUME, 60 PER MINUTE, AND AN ALMOST NORMAL *a-c* INTERVAL.

Sixteen months later he had an attack of influenza which again affected his heart and caused some dilatation, so he took another course of baths. After this second course his pulse was even better than after the first. It was of larger volume, the *a-c* interval was normal, and the rate was 62 per minute (Fig. 12).

He took some time to recover from his second attack, as the influenza had weakened him greatly, but he was at work again about two months after his illness, and has continued his business ever since, travelling to South Africa several times for this purpose. I have

seen him five times during the last four and a half years, since his treatment; he has always professed himself to be well and quite up to his work, and there has never been any return of the attacks of vertigo and faintness, or of the cardiac dilatation. He is now

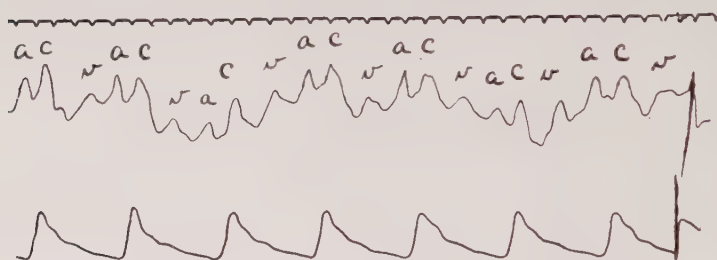


FIG. 12.—POLYGRAM OF CASE II., AFTER SECOND COURSE, SHOWING PULSE OF MUCH IMPROVED VOLUME, 62 PER MINUTE, AND A NORMAL *a-c* INTERVAL.

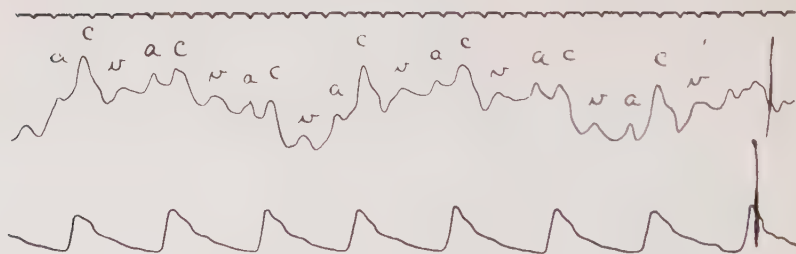


FIG. 13.—POLYGRAM OF CASE II., THREE MONTHS AFTER SECOND COURSE, SHOWING PULSE OF GOOD VOLUME, 62 PER MINUTE, AND A NORMAL *a-c* INTERVAL.

sixty-eight years of age, but continues to attend to his business, which is a decidedly responsible and arduous one, requiring much travelling about the world.

Fig. 13 is a polygram taken three months after his second course; it shows a pulse of good volume and normal *a-c* interval.

Three Examples of Class IV.

CASE III.—The patient, a man aged sixty-three years, was of a gouty constitution, and had been used to a large quantity of alcohol. He had a bad attack of influenza fifteen months before I saw him,

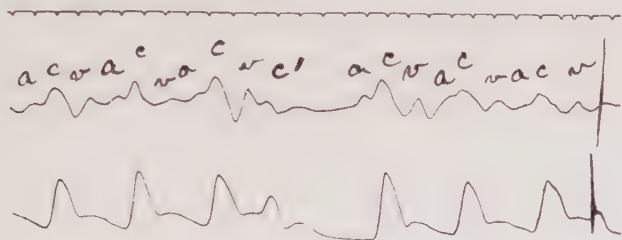


FIG. 14.—POLYGRAPHIC TRACING OF CASE III., BEFORE TREATMENT, SHOWING AN EXAMPLE OF PREMATURE VENTRICULAR CONTRACTION (*c'*).

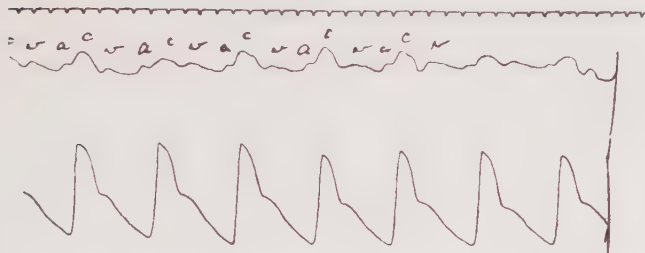


FIG. 15.—POLYGRAPHIC TRACING OF CASE III., AFTER TREATMENT, SHOWING REGULAR PULSE OF BETTER VOLUME AND SLOWER TIME, 60 PER MINUTE.

and had been failing in health ever since. For nine months he had suffered from severe asthma and bronchitis, and had been kept to bed and a bath-chair; he had, in fact, been told to buy a bath-chair and a carrying chair, and that there was little chance of his being well enough to walk again. When I first

saw the patient he looked ill, and was very cyanosed and short of breath, said he could neither eat nor sleep, having to be propped up at night, and suffered greatly from depression and cardiac asthma. He was puffy under the eyes, the pulse was 108 per minute and exhibited constant irregularities, the result of premature ventricular contractions (Fig. 14). The

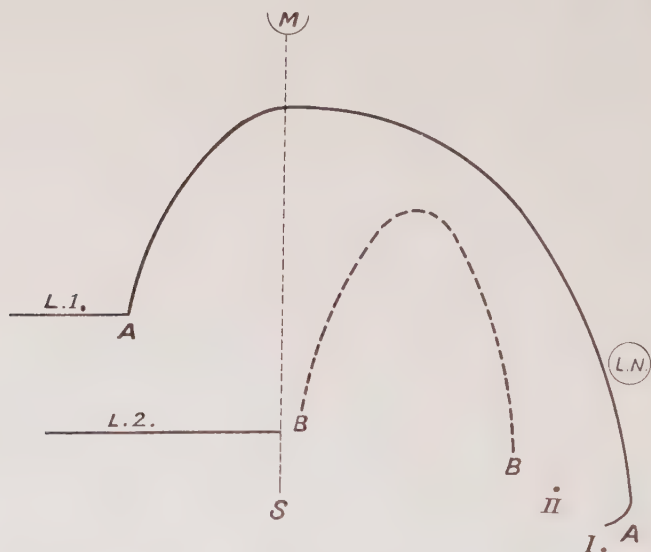


FIG. 16.—CASE III.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *L1*, upper border of liver dulness; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *L2*, upper border of liver dulness; *MS*, mid-sternum; *LN*, left nipple.

heart was very dilated, the area of absolute cardiac dulness measuring $6\frac{1}{2}$ inches across at the nipple level, and extended 2 inches to the right of the middle line; the apex-beat was just in the left nipple line,

and the heart sounds were very feeble (Fig. 16, *AA*). The arteries were thickened and tortuous, the blood-pressure was 80 to 150 mm. Hg., and his liver dulness extended from 2 inches above the normal level to an inch below the costal arch. I gave this patient a course of twenty-five "Nauheim" baths, extending over a period of five weeks. After three weeks' treatment he was so much improved that he could walk from a mile to a mile and a half, and therefore sold his bath-chair and carrying chair. At the end of the treatment he slept and ate well, had no dyspnœa or orthopnœa, and could walk two or three miles with comfort. His heart sounds were much stronger, his cardiac dulness was normal, extending from $1\frac{1}{2}$ inches inside the left nipple to the left border of the sternum; the apex-beat was 1 inch inside the left nipple-line, and the liver dulness had decreased by 2 inches (Fig. 16, *BB*). The pulse was of better volume and perfectly regular in time, 60 per minute (Fig. 15), and the blood-pressure had fallen to 70-125 mm. Hg.

A month after treatment this patient went to Australia, his native country, and wrote home from there, just a year after treatment, to tell me he was perfectly well, and able to enjoy long walks. Four years after treatment he wrote from New South Wales to me: "I am very well, no return of asthma or heart troubles since you treated me. I take plenty of exercise, go for long walks and sleep well, and have not needed any medical advice since I saw you."

CASE IV.—The patient, a man aged seventy-one

years, was sent to me by Dr. Grindlay of Stourbridge. For some years he had been short of breath, had had pain in the left side on slight exertion, had suffered from vertigo, headache, palpitation, and a choking sensation, and had been putting on weight. He had suffered from attacks of gout and "gravel." When I first saw him he was pale and stout, weighing 14 stone; his lips were somewhat cyanosed, he was markedly short of breath, and had œdema of the legs, from the knee downwards. His pulse was 75 per minute, of poor volume, regular in time and volume, and felt hard (Fig. 17).

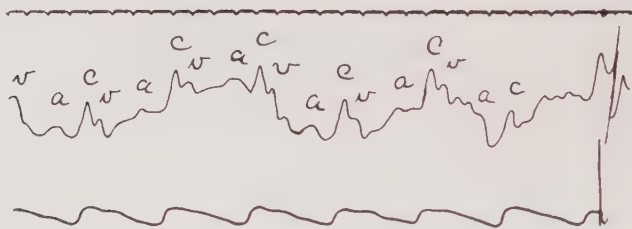


FIG. 17.—POLYGRAM OF CASE IV., BEFORE TREATMENT, SHOWING REGULAR PULSE OF POOR VOLUME, 75 PER MINUTE.

The area of cardiac dulness was much enlarged, extending from $\frac{3}{4}$ inch outside the left nipple line to $1\frac{3}{4}$ inches to the right of the middle line, and measuring 7 inches across at the nipple level (Fig. 18, *A.A*). The impulse was feeble, and the apex-beat was felt in the nipple line. A soft systolic murmur was heard at the apex and was conveyed into the axilla. The blood-pressure was 120-220 mm. Hg. There was a faint trace of albumen in the urine, but otherwise it was normal.

As he had been under treatment for some time, and had not improved to any extent, I gave him a course of "Nauheim" baths extending over a period of five weeks. At the end of the course he

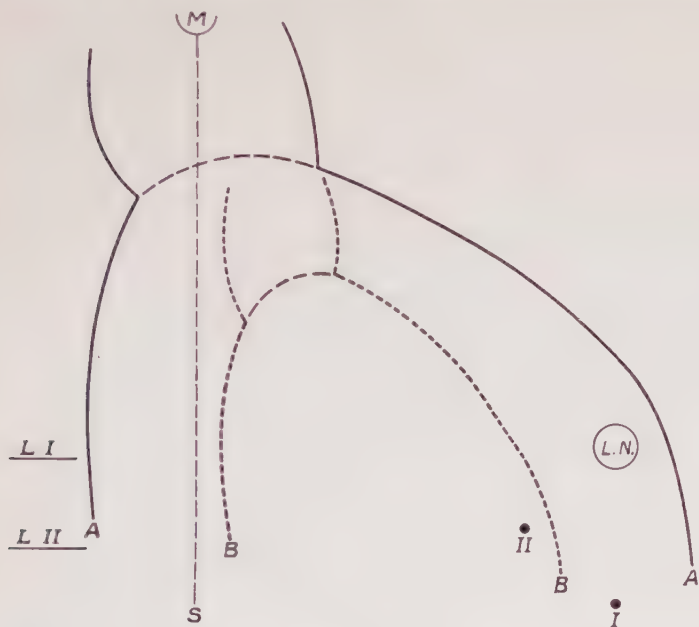


FIG. 18.

AA, area of absolute cardiac dulness of Case IV., before treatment; *I*, apex-beat before treatment; *L1*, upper level of liver dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat after treatment; *L2*, upper level of liver dulness after treatment; *MS*, mid-sternal line; *LN*, left nipple.

looked much better, was a good colour, had no dyspnoea or œdema, and no longer suffered from vertigo, headache, or palpitation, and his pulse was of much better volume, 57 to the minute, as compared

with 75 before treatment (Fig. 19). His blood-pressure had fallen to 85-190 mm. Hg.

The area of cardiac dulness was much smaller, measuring 4 inches across at the nipple level, as compared to $7\frac{1}{2}$ inches before treatment; the apex-beat was a good inch inside the nipple line, and the liver dulness was markedly less (Fig. 18, *BB*, *L I* and *II*). The patient returned home and was seen by Dr. Grindlay, who wrote to me saying: "I was very pleased with the improvement you have made in his con-

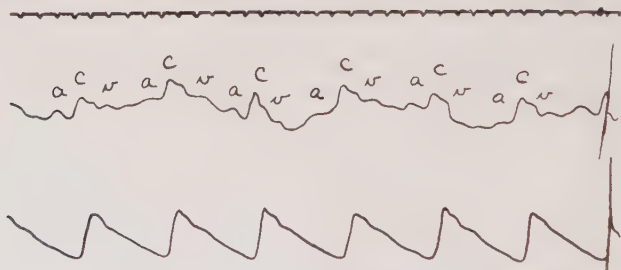


FIG. 19.—POLYGRAM OF CASE IV., AFTER TREATMENT, SHOWING PULSE OF MUCH IMPROVED VOLUME, 57 PER MINUTE.

dition; he appeared to me to look about ten years younger, and his pulse and abdominal condition were tremendously improved."

A year after treatment the patient began to notice some of his symptoms returning, so he came up to town and had another course, as the heart was again somewhat dilated and the blood-pressure had risen to 100-200 mm. Hg. Two years later he wrote to me, telling me that, although he had had a severe attack of influenza, he was keeping well and able to do his business.

CASE V.—The patient, a man aged sixty-two years, had served in the army in France during the Great War. Two and a half years before I saw him his vision suddenly became impaired on account of a retinal hæmorrhage, and he was invalided out of the army for arterio-sclerosis. A year and a half later he had an attack of left-sided hemiplegia. For some time after this he could not stand or use his left arm, and when he consulted me a year later he could only get about with difficulty by the aid of two sticks, and his left arm and leg were much weakened. He had been losing weight for some time, nearly 2 stone in a year, and he informed me that his urine contained sugar, and that he had for some time been treated for diabetes. He looked exceedingly ill, had a constant cough, with a good deal of expectoration, weighed 10 stone 12 pounds, and was markedly emaciated, his height being over 6 feet. His pulse was 100 per minute, of small volume, and felt hard. It was not possible to get a polygram as the vessel was so sunken between the tendons of the wrist. The lungs were emphysematous, and moist râles were heard all over the chest. The apex-beat could just be felt in the nipple line, there was no murmur, and the heart sounds were clear but not excessively loud. The heart was markedly dilated, the area of absolute cardiac dulness extending from $\frac{1}{2}$ inch inside the left nipple to $1\frac{1}{2}$ inches to the right of the middle line, indicating definite auricular dilatation, and measuring 5 inches across at the nipple level (Fig. 20, *AA*). There was

marked œdema of the ankles. The urine contained a trace of albumen as nucleo-protein, and 20·3 grains per ounce of sugar. The blood-pressure was 110-240 mm. Hg. An examination of the sputum showed that there were no tubercle present. As the patient had had enforced rest for two and a half years and was already on a suitable diet, a course of "Nauheim"

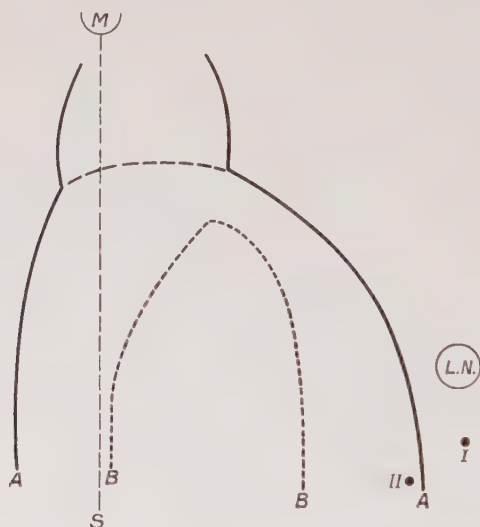


FIG. 20.

AA, area of absolute cardiac dulness, Case V., before treatment;
I, apex-beat before treatment; *BB*, area of absolute cardiac
 dulness after treatment; *II*, apex-beat after treatment;
MS, mid-sternal line; *LN*, left nipple.

baths was prescribed. During the course he steadily improved in health, and at the end of five weeks his cough was much better, he had put on nearly a stone in weight, could walk with only the aid of one stick instead of two, and the sugar was reduced to 16·8 grains

per ounce. The area of cardiac dulness was normal (Fig. 20, *BB*), the apex-beat was $\frac{1}{2}$ inch inside the nipple line, the blood-pressure had dropped to 100-170 mm. Hg., and the pulse-rate was 88 per minute.

As this patient's blood-pressure had shown a tendency to rise, and the heart had somewhat dilated, about a year after treatment, he has had two more courses in the last two years. He has steadily improved in health, keeps his weight at about 11 stone 10 pounds, can walk quite easily without the aid of any support whatever, has never had the slightest indication of another attack of hemiplegia, and the urine is quite free from sugar, although he eats fruit freely and a moderate amount of sweet cakes and potatoes. The amount of sugar in the urine dropped steadily from 20.3 grains per ounce to nil, in a little over a year after his first course, and since then there has rarely been more than a trace, and more often none. This case is one of advanced arterio-sclerosis complicated with diabetes and two attacks of hemiplegia; before treatment he was rapidly going downhill, steadily losing weight, and the sugar was increasing in amount. Treatment was only given as a last resource, as it was very doubtful whether he had not gone too far for anything to save him. Under these circumstances it is not surprising that he has had to have repeated treatment, but it is highly satisfactory that such an advanced case could be so improved in health, and the case is quoted as an example of what the "Nauheim" treatment will

sometimes achieve even in apparently hopeless conditions. There is no doubt whatever that if he had not had treatment he would not have been alive and in fairly good health, at the present time. The steady improvement in the glycosuria can only have been due to the establishment of a more normal metabolic process, the result of a better circulation.

It will be noted that Case IV. had to have a second course about a year after his first, and that since that time he has not required any further treatment. This is often the case with regard to advanced conditions of arterio-sclerosis; they need two and sometimes three courses, extending over a period of four or five years, to restore them to a state of fair health; after this they retain that health, in conjunction with a lowered blood-pressure, for several years. In cases of *pre-sclerotic* hyperpiesia with cardiac dilatation, the rule is otherwise, they being very often restored to perfect health by one course of treatment. A number of cases of this class have been under my observation for periods varying from seven to fifteen years after treatment, and have remained perfectly well. There are, however, exceptions to this general rule. Case II., despite his only being in the pre-sclerotic stage, required a second course sixteen months after his first, but this was only necessitated by the severe attack of influenza he had at that time, which caused cardiac dilatation and a return of symptoms, and he has now been perfectly well for four and a half years.

A careful examination of the urine in all cases has shown that in the pre-sclerotic type it is usually normal, whereas, in the sclerotic, it is sometimes normal, and sometimes exhibits a faint cloud of albumen and a somewhat lowered specific gravity, indicating that the sclerotic condition has begun to attack the kidneys. In the cases of primary nephritis the abnormal conditions of the urine are usually much more definite and are always present in a more or less degree.

No treatment whatever will cure a case of *sclerotic hyperpiesia*, and it is not claimed that "Nauheim" baths will do so, but all the evidence goes to prove that they will banish painful and dangerous symptoms for a long period, and will markedly lengthen life. Not only will they stay advancing sclerosis, but they will actually improve the condition of already diseased vessels, by assisting to eliminate toxic materials, and by supplying a flow of healthier and better oxygenated blood to the vessel walls. This great improvement in health and lengthening of life is well worth the inconvenience of a by no means disagreeable four or five weeks' course of baths.

CHAPTER III

ANGINA PECTORIS

UP to the present time, the treatment of angina pectoris by drugs, rest, and dieting has been far from satisfactory, and a case in which this dangerous and painful condition has been diagnosed is generally looked upon as one which will end with a fatal result sooner or later, and in which little more than palliative treatment can be adopted. Undoubtedly a very quiet life, great care in dietary, avoidance of all exertion, and the careful administration of such drugs as the iodide group, nitrites, etc., are of material help, especially if the treatment can be started and adhered to when the attacks are comparatively slight and of short duration. It is, however, unfortunately, almost impossible to get patients to realize the seriousness of this symptom in its beginnings, or the importance of observing the very strict and burdensome rules of life and diet, which are necessary to keep it in check.

To many the name " angina pectoris " indicates a *very severe pain* of a definite character, and it is therefore difficult for them to realize that all degrees of cardiac pain are of the same character, though not of the same severity. Comparatively slight cardiac pain

will often be diagnosed and treated as digestive trouble,¹⁹ simply because the pain manifests itself when the stomach is full of food, gas, or air, and is alleviated when it is entirely or partially emptied by eructation, vomiting, or digestion. The reason for this is explained by the fact that, when a heart, which is below par, is further handicapped in carrying out its functions, by the upward pressure of a distended stomach, its inadequacy is often manifested by pain. On the other hand, a normal heart will not give evidence of any distress, however much the stomach is filled or out of order, and therefore the presence of cardiac pain, palpitation, or dyspnœa, caused by digestive disorders, should always lead to a very careful examination of the heart, as one or all of these symptoms are definite indications that that organ is not in a normal condition.

Many theories have been brought forward to explain the cause of angina pectoris, and it would take much space to discuss them all; indeed, such a proceeding would be out of place in a short work which only presumes to deal with facts definitely connected with the practical treatment of this condition. Of the theories propounded up to the present, that of Sir Clifford Allbutt,²⁰ which he supports with much minute detail of post-mortem examinations, seems to me to be the correct one up to a certain

¹⁹ "Cardiac Pain." Dr. John Hay, *Lancet*, May 6, 1922.

²⁰ "Diseases of the Arteries, including Angina Pectoris." Sir Clifford Allbutt.

point, but it does not account for the paroxysmal nature of the attacks. He is of opinion that angina is always due to aortitis.

That aortitis is practically always present in cases of angina pectoris does not, however, explain the paroxysmal nature of the attacks, and one feels that there must be some superimposed phenomenon which is the actual cause of the paroxysms. The presence of aortitis of the first part of the aorta, causing narrowing of the orifices of the coronary arteries, would lead to a defective flow of blood along these vessels. In a case in which this condition is present, any irritation, such as unusual exertion, or the pressure of a distended stomach, might act upon the contracted, chronically inflamed and hyper-sensitive orifices of the coronary arteries, and cause a spasmodic contraction of those vessels, so that, for the time being, the cardiac tissues supplied by them would be cut off from the general blood-current, and a condition somewhat resembling "dead fingers" would be produced in the cardiac muscles. It is not only possible, but almost certain, that a condition of this kind, occurring suddenly, would be quite sufficient to cause the pain, difficulty of breathing, and other alarming symptoms, which constitute a paroxysm of angina. The fact that the vaso-dilatatory effects of the inhalation of amyl nitrite give almost instant relief in most cases, goes far to support this theory as to the causation of the actual paroxysm of angina; whereas the mere presence of aortitis would not

account for the paroxysmal nature of the attacks, nor for the rapid relief obtained from the inhalation of amyl nitrite.

A very high blood-pressure and arterio-sclerosis are not a necessary, or usual, accompaniment of angina; in fact, it is rare to find angina in cases of very advanced arterio-sclerosis. One would expect this to be the case if anginal attacks are due to spasmodic contraction of the coronary arteries, as I believe they are, for we should not expect such attacks in cases in which the vessels have become more or less rigid from arterio-sclerosis, they being less elastic and, therefore, less liable to spasmodic contraction. Sir Clifford Allbutt says²¹ that the coronary arteries are often quite free from disease in cases of death from angina, and Dr. B. H. Spilsbury²² has noted that interference with the coronary circulation, followed by sudden death, may result from disease of the first part of the aorta, frequently syphilitic aortitis, causing narrowing of the orifices of the coronary arteries, the vessels being otherwise free from disease.

From the evidence obtainable it would seem, therefore, that angina usually attacks patients who suffer from aortitis and whose coronary arteries are, in most cases healthy, except at their orifices. As something beyond the persistent aortitis is necessary to account

²¹ "Diseases of the Arteries, including Angina Pectoris." Sir Clifford Allbutt.

²² "Sudden Death." Dr. B. H. Spilsbury, *Practitioner*.

for the actual spasm of attack, it is a workable theory that this spasm is due to irritation of chronically inflamed coronary orifices, generating spasmodic contraction of the elastic and muscular tissue along their entire course.

Dr. John Hay²³ is of opinion "that cardiac pain is not evidence of any particular variety of pathological condition, but that it is rather an indication of functional disability." If this were the case, it would be very difficult to explain why angina does not occur to some extent in every case of disabled heart. It is, however, a well-known fact that a fair percentage of patients, with very defective and dilated hearts, do not suffer from any cardiac pain whatever, as is instanced in the comparatively large number of heart cases in which sudden death occurs without any previous warning, and the still greater number who assert that they never have any cardiac pain. It would therefore seem that we have good grounds to believe that angina only occurs when a certain form of pathological condition is present, and post-mortem evidence points to the conclusion that that condition is undoubtedly connected with arteritis at the base of the aorta. This being the case, I would suggest the following as a definition of angina pectoris: *Angina pectoris may be defined as a sudden attack of pain arising over the sternum and cardiac region, due to spasmodic contraction of the coronary arteries, the result of inflammation of the first part of the aorta.*

²³ "Cardiac Pain." Dr. John Hay, *Lancet*, May 6, 1922.

It is not my intention to discuss the treatment of angina by drugs, rest, or special rules of life, for these methods have been dealt with fully by many writers in England and abroad. In this country, however, balneological treatment has not received the attention which it merits; both on account of the very highly satisfactory results obtained from its use, and because it can be applied in a nursing-home or the patient's own house. Equally good results can be obtained as at any spa, English or foreign, if sufficient care and trouble are taken with regard to the minute details of treatment; though a certain amount of experience is necessary in its administration.

One of the reasons why this method of treatment has been somewhat neglected in England, is found in the attitude taken with regard to it by some writers upon the subjects of cardiac and arterial diseases. A typical example of this attitude is found in Sir Clifford Allbutt's book upon "Diseases of the Arteries, including Angina Pectoris." After giving an account of the successful treatment of arterio-sclerotic patients at Nauheim by the late Dr. Groedel, he says: "In England, where bathing is generally left to attendants, these scientific niceties are not observed; it is better, therefore, in this country to treat arterio-sclerotic patients, whether hyperpietic or decrescent, by other methods."

In the first place, my experience of foreign spas, Nauheim included, has not led me to believe that treatment is left more to attendants in England

than it is abroad; it is, in fact, left much more to attendants, both at home and abroad, than in my judgment it ought to be. In the second place; it seems a very poor argument in favour of abandoning a treatment, which is owned to be successful when properly carried out, to hint that it is given improperly at some spas, and therefore should not be given at all.

I maintain that it is within the power of every medical man, who will give the time and take the trouble to acquire the necessary experience, by personally superintending the administrations of the baths, to fit himself to carry out the "Nauheim" treatment anywhere, with as good, if not better, results than are obtained at Nauheim, where it is given in that wholesale manner common to spa treatment, and where the large number of patients makes it practically impossible for the physician to supervise the bathing in each individual case, as carefully as he should do if he wishes to get the best results.

In the past many physicians in this country have advised their patients to go to foreign spas for baths and other forms of treatment. One cannot help feeling that, if they had given their time and skill to the scientific improvement of English balneological methods, they would have done as well for their patients, and better for their country, for there is no doubt that scientific balneology has been much neglected by many of the heads of our profession in England, up to the present.

There are very few cases of angina pectoris that will not derive benefit from a course of properly administered "Nauheim" baths, and in many instances, in which the treatment by drugs, rest, and dietary has produced little improvement, a course of baths has either abolished attacks for a long period, or rendered them less frequent and less severe. A great mistake that is often made, is leaving balneological treatment as a last resource, when all other methods have been tried in vain, when the patient's condition is gradually deteriorating, and his strength is sapped by repeated attacks of angina, and the ever-present fear of recurrent spasms. Even in severe cases of long standing very good results are obtained; in one, that of a patient who used forty to fifty capsules of amyl nitrite daily, before treatment, the frequency and severity of the attacks greatly decreased during the course, and two months after it was completed he was absolutely free from them (Case VII.).

A patient suffering from angina should never have to make a daily journey to a nursing-home or bath establishment, for the purpose of treatment, as such a proceeding militates greatly against a successful result; he should always be resident in the nursing-home, or be given treatment in his own house, hotel, or lodgings, so that he may be able to get straight out of bed into the bath, and back from the bath to bed, for the necessary hour's rest, without involving the exertion required in the undressing and dressing

which is unavoidable if he does not reside on the spot where the baths are given. The usual proceeding observed at many watering-places—the getting up, dressing, proceeding to the bath-house, undressing, bathing, reclining on a couch for a time, dressing again and returning home—is a very great strain upon cases of this kind, and to give treatment under such circumstances, is to minimize materially the benefit which would be obtained from a course given under more satisfactory conditions. It is quite suitable for the gouty or rheumatic patient to have to make a certain amount of effort in following out his bath course; in fact, it does him good to do this, and is, no doubt, a useful part of the treatment, especially in the full-blooded and overfed type. But in the case of those suffering from angina or cardiac disease, the reverse holds good.

The dilatation of all the cutaneous capillaries produced by immersion in a "Nauheim" bath, may be likened somewhat to the effect of the inhalation of amyl nitrite, with these differences. The capillary dilatation is slower and more general, does not produce any unpleasant sensation of fulness or headache, and is very much more lasting than that of the drug. This dilatation causes a fall of blood-pressure and relieves any condition of contractile spasm present in the vessels, thereby lessening the resistance to be overcome by cardiac contraction, so that the heart is enabled to do its work quite satisfactorily, with a decidedly slower beat than was required before

immersion, and, consequently, a sedative and antispasmodic condition of circulation is established. This condition continues for some time after the bath, and is more pronounced and more enduring after each succeeding bath. The lowered blood-pressure, the dilated capillaries, and the improved cardiac contraction, all tend to a decided improvement in the circulation. Those parts of the circulatory system which are specially involved in angina—namely, the first part of the aorta, the coronary vessels, and the cardiac muscles, all share in this improved circulation, and are better nourished, and, therefore, better able to withstand any tendency to the degenerative process which is affecting them. As the degenerated tissues are supplied with a better oxygenated blood-flow, they gradually tend to become more healthy and to throw off any inflammatory condition due to malnutrition or toxic poisoning. The patient's health may, therefore, be expected to go on improving for some months after the course is finished; these nutritive changes, indeed, are necessarily slow, so that one must not be disappointed if the improvement during the course is not very rapid. Personally, I have never treated a case of angina which has not shown material and steady improvement both during the course, as well as for some months after it.

Cardiac dilatation is not necessarily present in all anginal cases, but when it is, it complicates and intensifies the condition. I have never known a fatality

in a case of angina where there was no accompanying dilatation, and I am therefore led to believe that all fatal cases of angina have developed more or less cardiac dilatation, before they succumb to an attack, and that patients are safe from a fatal result if there is no accompanying dilatation. Valvular disease is not a necessary, nor even a usual, complication in anginal cases; if, however, it is present, balneological treatment is not counter-indicated (Case VII.). If we can get rid of the dilatation in a case of angina, we can practically be certain that that patient will not die until dilatation is again developed, and as we can be sure of curing dilatation for a long period by giving a course of baths, we can, by repeating this treatment at intervals of from two to six years, or longer, according to the severity of the case, banish pain and prolong life. These facts are definitely proved by the clinical histories of the cases quoted below, as typical of the effect of the treatment.

The following are examples of anginal cases treated by balneological methods; two of them have been kept under observation for a period of over six years, the others have not been observed for so long a time, but are typical of the excellent results usually obtained. They vary greatly in age, height of blood-pressure, extent of cardiac dilatation, absence or presence of valvular disease, and other complications. The only symptom they possessed in common, was that of suffering from marked anginal attacks.

CASE VI.—The patient, a lady aged sixty years, had a severe attack of influenza thirteen months before she consulted me, since when she had had to lead an invalid life, spending her time between the couch and bed, and suffering from anginal pains on the slightest exertion. These pains often occurred several times in the day, and on more than one occasion the severity of the pain caused her to faint. When I first saw her, the heart's action was very

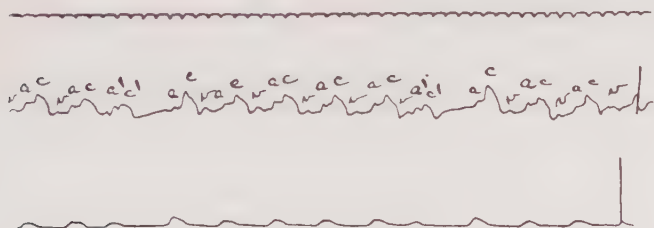


FIG. 21.—POLYGRAPHIC TRACING OF CASE VI., BEFORE TREATMENT, SHOWING TWO EXAMPLES OF THE CONSTANT PREMATURE AURICULAR CONTRACTIONS, *a'c'*, AND A PULSE OF VERY SMALL VOLUME

irregular and the pulse very feeble, 96 per minute in the recumbent position; the irregularities were caused by constant premature auricular contractions (Fig. 21).

On auscultation, the second sound over the aortic base was very slapping and bell-like in tone, there was no indication of decided cardiac dilatation, and the apex-beat was in the nipple line. The vessels showed slight arterio-sclerotic changes, the minimum blood-pressure was 95 mm. Hg., and the maximum 160 mm.

Hg.; the urine was normal. She was treated with absolute rest, a careful dietary, a mixture containing liquor, trinitrini, and tablets of strophanthus, as I have found this combination to produce the best results in these cases. She improved somewhat but not to any great extent, any slight exertion still bringing on the anginal attacks, which necessitated the use of two or three capsules of amyl nitrite daily. I then advised a course of "Nauheim" baths and resistance-exercises, but before giving them I took her to Dr. Arthur P. Luff; he agreed with me that the case was a suitable one for the treatment, but suggested the trial of a course of iodides first. These, however, did not suit her, for she got worse under them, and had a bad attack of syncope, so she started a course of "Nauheim" treatment after consultation with Dr. Luff. For the first eight days the baths were not given, because she was not strong enough to take them, but she had a few of the resistance-exercises daily. The strength and regularity of the pulse were so improved by these exercises, that she was able to start the baths on the ninth day. Henceforward, baths were given on Mondays, Tuesdays, Thursdays, Fridays, and Saturdays, the exercises on Wednesdays, and the Sundays were rest-days. She took a course of twenty-five baths extending over five weeks, and began to improve from the first onward; the severity and frequency of the attacks lessened, and the pulse became quite regular in time, after the first fortnight, and much larger in volume. At the end of the

treatment the anginal attacks were very slight and occurred only once or twice a week, instead of three or four times a day, the pulse was quite regular in time and of good volume (Fig. 22). The blood-pressure was 80-145 mm. Hg., a drop of 15 mm. Hg.

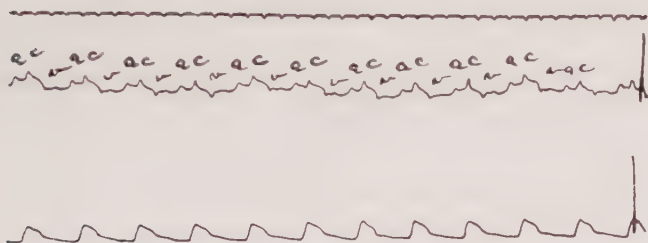


FIG. 22.—POLYGRAPHIC TRACING OF CASE VI., AFTER TREATMENT, SHOWING AN ABSOLUTELY REGULAR PULSE OF BETTER VOLUME.

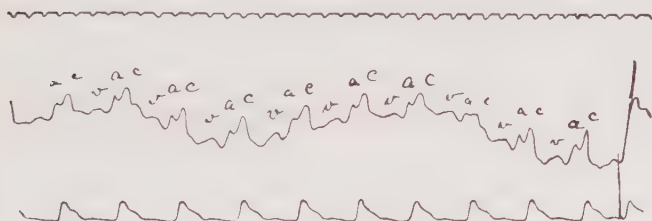


FIG. 23.—POLYGRAPHIC TRACING OF CASE VI., THREE MONTHS AFTER TREATMENT, SHOWING PULSE OF STEADILY IMPROVING VOLUME AND SLOWER RATE, 79 PER MINUTE.

in both the maximum and minimum pressures, and she was able to be up and about and enjoy short walks.

Three months after treatment she was better in every way, and could walk about two miles and enjoy life. The pulse was of still better volume, quite regular and of slower rate, 79 per minute (Fig. 23).

The second sound over the aortic area was much less slapping, and the bell-like tone was no longer present. Ten months after treatment she was still in better health, and the pulse was stronger and slower (Fig. 24). Fifteen months after treatment she was

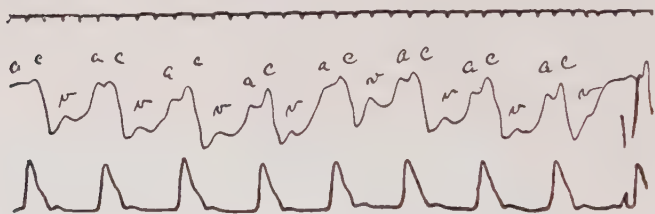


FIG. 24.—POLYGRAPHIC TRACING OF CASE VI., TEN MONTHS AFTER TREATMENT, SHOWING PULSE OF VERY GOOD VOLUME AND SLOWER RATE, 76 PER MINUTE.

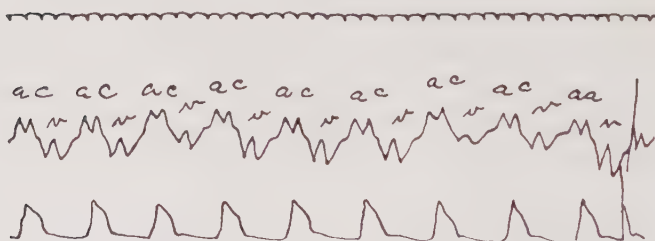


FIG. 25.—POLYGRAPHIC TRACING OF CASE VI., FIFTEEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME, 68 PER MINUTE.

still in very good health and had no pain, and the pulse was of good volume, 68 per minute (Fig. 25).

Two years after treatment she began to feel slight pains again, so had a second course of baths to prevent a relapse. Her pulse before the second course was of small volume, 75 per minute (Fig. 26).

After the second course the pulse was of much better volume and the same rate (Fig. 27).

Four and a half years after this course, the patient was still in good health, and has had no return of the anginal pains. She is now near sixty-seven years

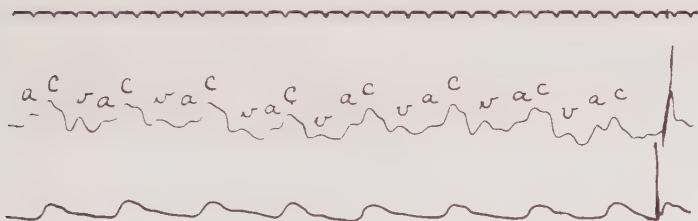


FIG. 26.—POLYGRAM OF CASE VI., BEFORE SECOND COURSE, SHOWING PULSE OF SMALL VOLUME, 75 PER MINUTE.

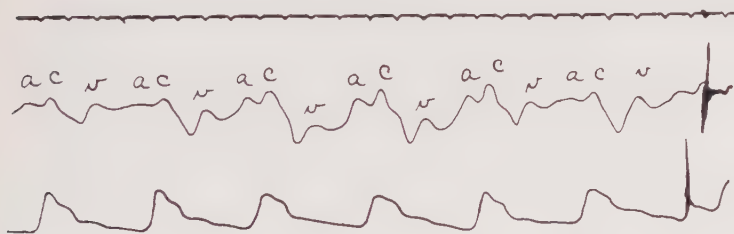


FIG. 27.—POLYGRAM OF CASE VI., AFTER SECOND COURSE, SHOWING PULSE OF MUCH IMPROVED VOLUME.

of age and enjoys very much better health than she did at the age of sixty.

CASE VII.—The patient, a man aged forty-one years, was brought to me by Dr. Johns of Bourne-mouth. The history of the case is as follows: Two years previously he was suddenly seized with violent pains in the left side of the chest and left arm,

accompanied by severe shortness of breath. These attacks increased in severity and frequency, despite various forms of treatment, and for over a year he had been an absolute invalid, unable to do anything for fear of bringing on an attack. He could scarcely eat anything, had very broken nights on account of the frequent recurrence of these attacks, and had lost a good deal of weight. The only treatment that alleviated the attacks was the use of amyl nitrite capsules, of which he was using forty to fifty in the twenty-four hours, his attacks of pain coming on about every half-hour. No definite cause could be discovered for his condition, except that he had been a fairly heavy drinker for years.

When Dr. Johns first brought him to see me, he looked very ill, was very anæmic and cyanosed, and suffered from dyspnœa, even whilst sitting still. He was very thin, and though a tall man, only weighed 9 stone 7 pounds. His pulse was 100 per minute, a typical pulse of aortic regurgitation, violent pulsation could be seen in the neck and in all vessels near the surface, and his whole arm pulsed with each heart-beat; his blood-pressure was 40-190 mm. Hg.

On examination of the chest, the impulse was seen to be general over the whole of the left front, and at the apex, 2 inches outside the left nipple line, it was very forcible and diffuse; the area of absolute cardiac dulness was exceedingly large, extending

for $2\frac{1}{2}$ inches to the right of the sternum to 2 inches to the left of the left nipple, and measuring 8 inches across at the nipple level (Fig. 28, *AA*). On auscultation, a loud double murmur could be heard over the aortic area, and a strong blowing systolic

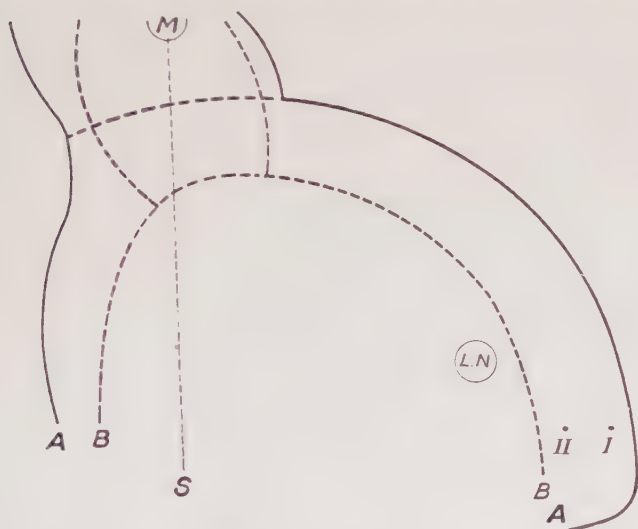


FIG. 28.—CASE VII.

AA, area of cardiac dulness before treatment; *I*, apex-beat; *BB*, area of cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

The increased area of dulness over the base of the aorta before treatment showed definite aortic dilatation.

over the apex, conveyed into the axilla. He had two attacks of angina whilst in my consulting-room. On each occasion he became very white, the dyspnoea was greatly increased, and the symptoms were not relieved till he had used a capsule of nitrite of amyl.

He was undoubtedly suffering from a greatly dilated and hypertrophied heart, accompanied by double aortic disease, mitral regurgitation, and frequent attacks of angina pectoris. A polygraphic tracing of his pulse showed a rapid pulse, 93 per minute, and a decidedly increased *a-c* interval, indicating impaired cardiac conductivity (Fig. 29). The rounded apex to the radial pulse tracing was caused by the necessity of pressing the pen heavily upon the paper

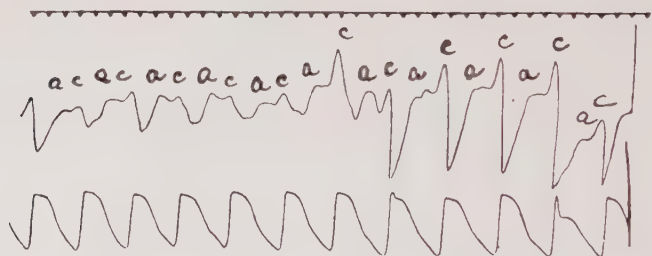


FIG. 29.—POLYGRAPHIC TRACING OF CASE VII., BEFORE TREATMENT, SHOWING DECIDEDLY INCREASED *a-c* INTERVAL; PULSE 88 PER MINUTE.

in order to prevent the whole breadth being taken up by the violent movement of the radial curve.

I explained to the patient that a course of "Nauheim" baths would most likely do him good, as anginal cases had been alleviated by them. I advised him to try them, for it was his last chance of relief, all other treatments having failed, but it was pointed out that they would not cure him entirely, and that the benefit, so severe a case as his would get from the treatment, was uncertain. He decided, however, to try a course, for he said that if he went

on very long as he was the pain and the insomnia would kill him. He started a course of baths, at which time he was using from forty to sixty capsules of amyl nitrite in the twenty-four hours. He began to improve from the first, the attacks of angina decreasing in number and severity; after ten days' treatment, during which time he had had eight baths, he was only using sixteen to twenty capsules in the twenty-four hours. After nineteen baths,

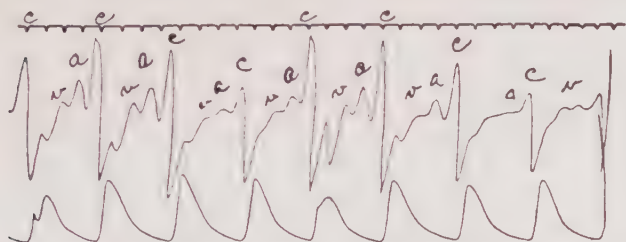


FIG. 30.—POLYGRAPHIC TRACING OF CASE VII., AFTER TREATMENT, SHOWING SLOWER PULSE AND NORMAL *a-c* INTERVAL.

extending over a period of twenty-five days, he was sleeping and eating well, had put on 1 stone 3 pounds in weight, his weight being 10 stone 10 pounds, and he seldom used a capsule of amyl nitrite during the day, but still used from six to eight during the night. His pulse was slower, 78 per minute, and the *a-c* interval was normal (Fig. 30).

The cardiac dulness was decidedly less, measuring 6 inches across at the level of the nipple, and extended from 1 inch to the right of the sternum to 1 inch to the left of the left nipple; the apex-beat had come in as well, and was 1 inch outside the

nipple line (Fig. 28, *BB*). Both the pulsation and the murmurs were much reduced in strength, and the maximum blood-pressure was only 145 mm. Hg.

Two months after the patient had returned home, Dr. Johns wrote to me to say that he was very much better, and had given up taking amyl nitrite, as he never had an attack of angina. Two months later he again wrote, as follows: "Still more wonderful reports of our patient B——. He has now put on 2 stone in weight, sleeps well, eats well, has no pain, and the murmurs have changed in character, being much softer." This patient was so seriously ill when I first saw him that I hardly expected the treatment to have so highly satisfactory a result.

CASE VIII.—The patient, a single lady, aged fifty-eight years, suffered from "heart-strain" ten years before I saw her. She was laid up for six weeks and could only walk a short distance for some months afterwards, on account of pain, intermittent heart's action, and shortness of breath. Two years later she developed anginal attacks, and continued to have them three or four times a year, till three months before she saw me, when she had a severe attack of influenza, since which she had had anginal attacks about every month. The attacks lasted about half an hour, and she was laid up for some days after each, with collapse. When I first saw her, her hands showed the typical deformities of rheumatoid arthritis, her vessels were somewhat sclerotic, she was rather cyanosed, exceedingly thin, and could

not take any exercise on account of weakness. The area of cardiac dulness extended from the right border of the sternum to the left nipple line, indicating definite cardiac dilatation (Fig. 31, *AA*).

The impulse was very feeble, the blood-pressure was 90-140 mm. Hg., and her pulse was regular in time, 100 per minute, and of fair volume (Fig. 32).

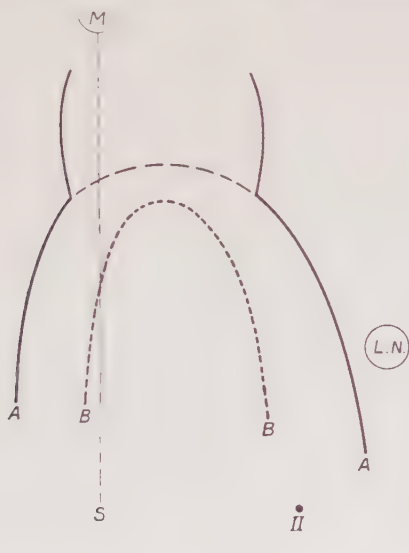


FIG. 31.

AA, area of cardiac dulness, Case VIII., before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *MS*, mid-sternal line; *LN*, left nipple.

I treated her for three months with drugs, careful rules of life, and dietary, and her health improved to a certain extent, but at the end of this period she had a severe anginal attack which laid her up

for some days, so I started a course of "Nauheim" baths. A month after treatment she could walk a mile comfortably, and had not had an anginal attack, the pulse was stronger in volume and slower in rate, 75 per minute (Fig. 33).

The area of cardiac dulness extended from an inch inside the left nipple line to the left border of the

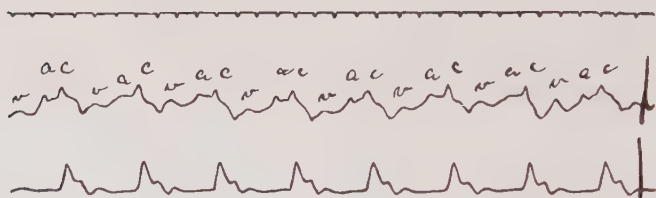


FIG. 32.—POLYGRAPHIC TRACING OF CASE VIII., BEFORE TREATMENT, SHOWING PULSE OF FAIR VOLUME.

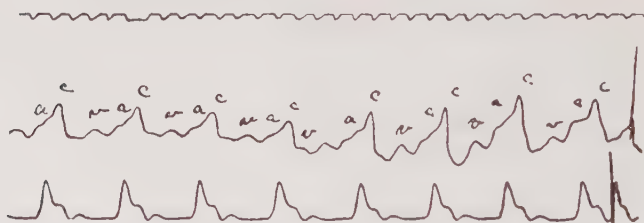


FIG. 33.—POLYGRAPHIC TRACING OF CASE VIII., AFTER TREATMENT, SHOWING IMPROVED VOLUME AND SLOWER RATE OF PULSE, 75 PER MINUTE.

sternum, and the apex-beat was 1 inch inside the nipple line (Fig. 31, *AI, II*), the impulse being much stronger than before treatment. Six months later she had a severe attack of influenza, but no angina pectoris, and nine months after treatment she had had no recurrence of attacks and felt quite well.

Eighteen months after treatment the patient was in perfectly good health, her blood-pressure was 80-135 mm. Hg., and she had had no more anginal attacks.

Six years after treatment she still enjoyed good health and was entirely free from anginal attacks.

CASE IX. —The patient, a man aged fifty-three years, had been suffering from indigestion and flatulence, and pain right through the middle of the chest and down the left arm on exertion, for twelve months. He took no alcohol, did not smoke, and gave a

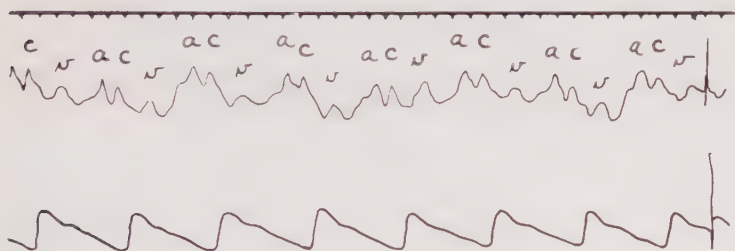


FIG. 34.—POLYGRAM OF CASE IX., BEFORE TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME, 57 PER MINUTE, AND NORMAL *a-c* INTERVAL.

negative Wassermann reaction. He looked ill and anxious, was decidedly thin, and complained of shortness of breath, as well as pain on exertion. His pulse was regular in time, of moderate volume, 57 per minute, and felt soft (Fig. 34).

His heart sounds were normal and his blood-pressure was 80-120 mm. Hg. The area of cardiac dulness was moderately enlarged, extending from the left nipple line on the left, to about mid-sternum on

the right, and measuring 4 inches across at the nipple level (Fig. 35, *AA*), and the apex-beat was felt just inside the nipple line (Fig. 35, *I*). His urine was 1,014 sp. gr., contained a trace of nucleo-protein, and 1.8 per cent. of urea. I treated him for ten months with dieting, stomachics, and antispasmodics, for his attacks, but as he was only slightly improved,

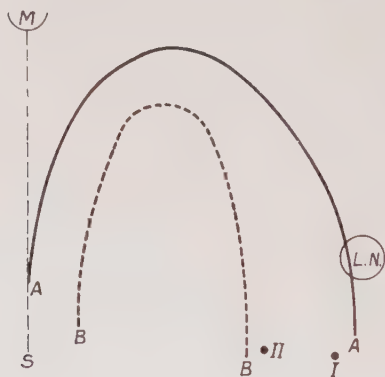


FIG. 35.

AA, area of cardiac dulness of Case IX., before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternal line.

and had a very bad attack of angina at the end of the ten months, I advised a course of "Nauheim" baths, but before starting them took him to see Dr. Robert Young, who agreed with me in the diagnosis and treatment.

He had five weeks' treatment, and during this period his attacks gradually became less frequent and less severe, till he was practically free from them.

He looked much better, had put on weight and had no indigestion. The pulse was of much better volume, and the same rate (Fig. 36).

The urine was 1,018 sp. gr., contained a trace of nucleo-protein and 2.4 per cent. of urea. The area

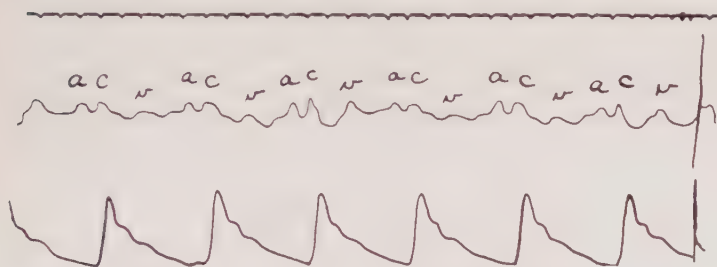


FIG. 36.—POLYGRAM OF CASE IX., AFTER TREATMENT, SHOWING A PULSE OF MUCH BETTER VOLUME.

of cardiac dulness was normal, extending from a good inch to the inside of the left nipple, to an inch to the left of the middle line, measuring 2 inches across at the nipple level; and the apex-beat was $1\frac{1}{4}$ inches inside the nipple line (Fig. 35, *AA, II*). Five months later this patient wrote to me from Africa, to tell me that he had not experienced the slightest pain or inconvenience since the treatment.

HAPTER IV

VALVULAR DISEASE AND FATTY HEART

FROM the time of the introduction of the stethoscope to the invention of the sphygmomanometer, valvular disease of the heart held by far the most important position amongst cardiac diseases, and was generally regarded as the primary cause of all circulatory troubles; and any valvular defect, whatever its nature or extent, was looked upon as a grave condition and a certain factor in shortening life. When, however, the attention of the medical profession was drawn to the importance of blood-pressure records, those who studied the subject carefully, soon discovered that chronic cardiac dilatation and hypertension, often accompanied valvular disease, and that most of the serious symptoms were due to failure of the muscular walls of the heart to combat the hypertension, or to withstand the extra work thrown upon them by a defective valve, even in cases where the tension was not high. In fact, it was found that certain kinds and degrees of valvular disease, more especially mitral regurgitation, did not necessarily materially shorten life, so long as the muscular walls of the heart were healthy, and did not give way under the strain, and dilate. In short, our present knowledge of

cardiac disease leads us to the conclusion that cardiac dilatation is the real danger in cases of valvular disease, and that where it does not exist, or where it is got rid of by treatment, the danger is slight. James Mackenzie²⁴ says: "When the muscle is unimpaired little or no bad effect may follow. . . . The really serious trouble in connection with mitral regurgitation is due to a complication of the dilated orifice and diseased valve." Graham Steell²⁵ says: "The change in the valves is altogether inadequate to explain the evidently free regurgitation that occurred during life, and the disastrous dilatation of the heart. The muscle-failure factor, it may be presumed, was the essential one."

Frederick A. Willius²⁶ is of opinion that, "cardiac efficiency is determined by the integrity of the myocardium."

The teaching that the valvular defect was the direct cause of the symptoms, and that, that defect being incurable, the symptoms were also incurable, and therefore nothing could be done for such cases except treatment by rest and cardiac tonics, has been in vogue for so long a period, that some medical men are still under the mistaken impression that the "Nauheim" treatment is of no use in cases of valvular disease. Although it is true that no treatment whatever will cure valvular disease, yet the symptoms

²⁴ "Diseases of the Heart." Sir James Mackenzie, p. 227.

²⁵ "Textbook on Diseases of the Heart." Steell.

²⁶ "Clinical Electrocardiology." F. A. Willius.

which are the outcome of the failure of the heart-muscle to struggle against the excessive strain put upon it, by a faulty valve and by hypertension, can very often be cured for a long period by a course of "Nauheim" baths.

I have successfully treated a large number of patients suffering from various forms of valvular disease, and complaining of such symptoms as palpitation, dyspnœa, dyspepsia, and general ill-health, and showing signs of cyanosis and œdema. These cases always suffer from cardiac dilatation to a greater or less extent. It is clearly evident that such dilatation would increase any failure of apposition of the cardiac valves, and that if the dilatation can be cured, the condition of the patient would be greatly improved, for not only is the valvular defect reduced to a minimum, but the muscular walls of the heart recover tone, and are more able to cope with the extra work which is thrown upon them.

The following cases are typical of this class, and the great improvement in their condition, following a course of treatment, is the usual result in such cases, provided they have not been left till the last stage, and cardiac failure is well established. To treat these chronic cases by no other method than the administration of digitalis and allied cardiac tonics, may be likened to whipping up a tired horse, and a time will come when there will be no response to the stimulation of the whip. The only treatment that produces any lasting improvement is the relief of the strain, by

dilatation of the entire capillary circulation, so that the heart's work is lessened and its walls can have the opportunity of contracting satisfactorily and regaining tone and strength. This opportunity is afforded by a course of "Nauheim" baths.

CASE X.—The patient, a man aged fifty-seven years, was sent to me by Dr. W. H. Gregory of Beverley, who informed me that the patient was suffering from mitral regurgitation, cardiac dilatation, and muscle failure. He had been confined to his bed for eight weeks on account of palpitation, dyspnœa, insomnia, general weakness, and very intermittent pulse, and had improved to a certain extent, but for some time had been at a standstill. He had had rheumatic fever, accompanied by pericarditis and endocarditis, when he was fourteen years of age. When I first saw him, he was very thin and weak, and could not walk many steps without having to sit down; he was distinctly cyanosed, and dyspnœa was present on slight exertion. His pulse was very small, and exhibited premature auricular contractions (Fig. 38); and he was unable to sleep without a narcotic, and suffered much from dyspepsia. He had undergone severe physical exertion in earlier life, having been an explorer and big-game hunter, and having walked twice across Africa during his expeditions.

The area of absolute cardiac dulness extended from 2 inches to the right of the right border of the sternum, to the left nipple line, the apex-beat being just inside the left nipple line (Fig. 37, *AA*).

A loud blowing systolic murmur was heard all over the cardiac area, but was most intense at

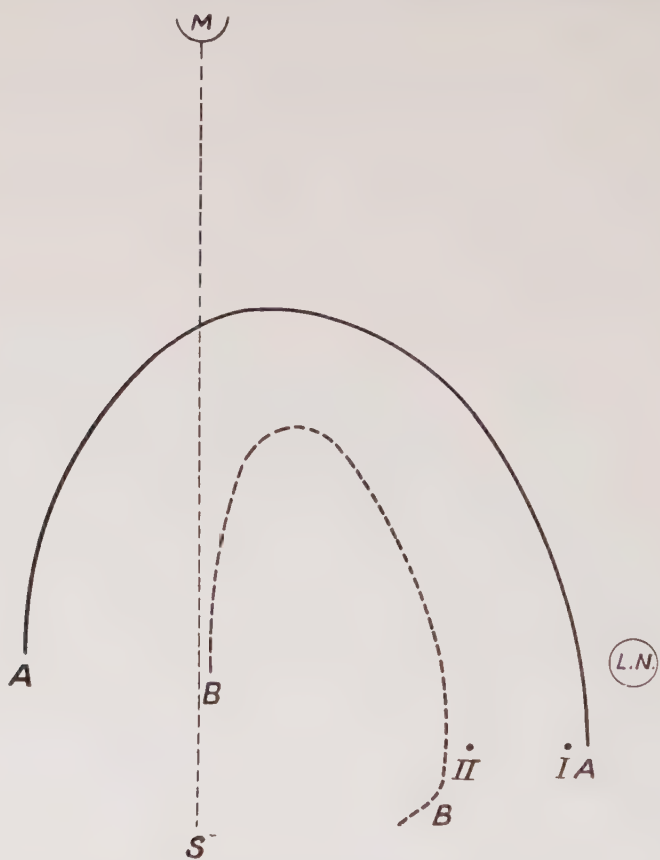


FIG. 37.—CASE X.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

the apex, and was conveyed into the axilla. His blood-pressure was 75-125 mm. Hg. The case was

undoubtedly one of cardiac dilatation, due to weakening of the myocardium and mitral regurgitation. He gradually improved under treatment, and before the end of the course of twenty-five baths,

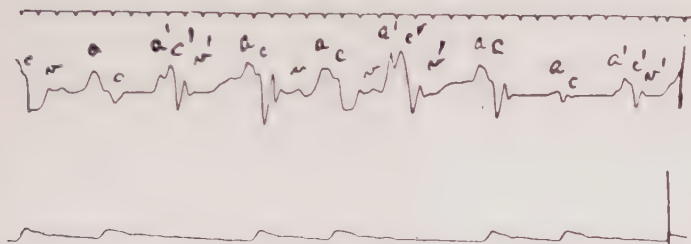


FIG. 38.—POLYGRAPHIC TRACING OF CASE X., BEFORE TREATMENT, SHOWING A PULSE OF SMALL VOLUME EXHIBITING FREQUENT PREMATURE AURICULAR CONTRACTIONS ($a'c'v'$), THREE EXAMPLES OF WHICH ARE SHOWN. THE $a-c$ INTERVAL IS NORMAL. THE PREMATURE CONTRACTIONS ARE NOT STRONG ENOUGH TO PRODUCE ANY EFFECT UPON THE RADIAL PULSE.

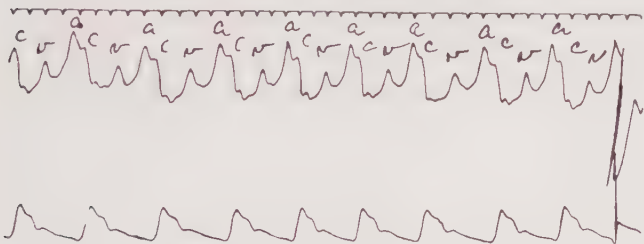


FIG. 39.—POLYGRAPHIC TRACING OF CASE X., FIVE MONTHS AFTER TREATMENT, SHOWING A PERFECTLY REGULAR PULSE OF MUCH IMPROVED VOLUME. THE $a-c$ INTERVAL IS NORMAL; PULSE-RATE 68 PER MINUTE.

extending over five weeks, he had lost the dyspnœa, palpitation, and dyspepsia, could walk for a quarter of an hour to 20 minutes, and slept fairly well, with a very occasional narcotic. His cardiac dulness

had decreased to normal, extending from the left border of the sternum to 2 inches inside the left nipple (Fig. 37, *BB*), the systolic murmur was very much softer and much less diffuse. He returned home to Yorkshire, and was able to walk about his grounds with comfort, and to go up and down stairs, which he had not been able to do since the beginning of his illness.

I saw this patient five months after treatment, when he informed me that he could keep about all

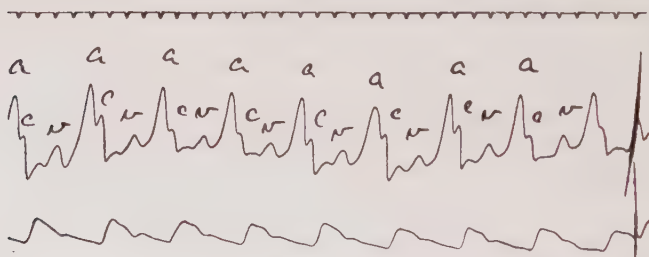


FIG. 40.—POLYGRAPHIC TRACING OF CASE X., SEVEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME, *a-c* INTERVAL NORMAL, RATE 70.

day, sleep and eat well, and had no dyspepsia. His cardiac dulness was still absolutely normal, and the pulse was quite regular and of good volume (Fig. 39).

I saw the patient again seven months after treatment. He was still keeping quite well, the cardiac dulness was normal, and the pulse was regular and of fair volume (Fig. 40).

Just a year after the first course of baths the pulse became somewhat irregular again, the cardiac symptoms began to return, and the heart showed

slight dilatation; he therefore took a second course of baths as a precautionary measure. His health has remained satisfactory since that time, and he is now able to lead a normal life, walking, driving, and shooting. Fig. 41 is a polygraphic tracing taken

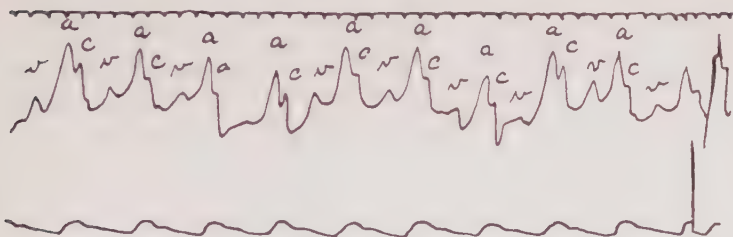


FIG. 41.—POLYGRAPHIC TRACING OF CASE X., TWO YEARS AFTER SECOND COURSE, SHOWING PERFECTLY REGULAR PULSE OF SMALL VOLUME.

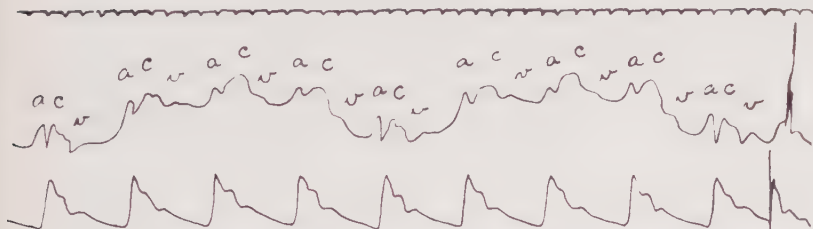


FIG. 42.—POLYGRAPHIC TRACING OF CASE X., TWO YEARS AND SEVEN MONTHS AFTER SECOND COURSE, SHOWING ABSOLUTELY REGULAR PULSE OF GOOD VOLUME, 62 PER MINUTE.

two years after his second course, of baths, when he was still in good health: his cardiac dulness was normal, and the systolic mitral murmur was still present.

Two years and seven months after the second course of baths the patient felt in perfect health, he

was able to do a long day's work, from 9 a.m. till 10 p.m., he slept well and could eat anything without any signs of dyspepsia, his pulse was strong in volume, 62 per minute, and absolutely regular in rhythm, and he said he had not felt any intermittency for over twelve months (Fig. 42). The systolic murmur was still present, and could be heard all over the cardiac area, but the area of cardiac dulness was absolutely normal, and the impulse was $1\frac{1}{2}$ inches inside the left nipple line, and was not too forcible or diffuse.

Seven years and a half after his second course I heard from him that his heart had given him no trouble whatever since.

CASE XI.—The patient, a lady aged twenty-one years, was sent to me by Dr. T. A. Bowes, of Herne Bay. She had had scarlet fever at the age of seven years, and rheumatic fever and endocarditis twice, once when she was seventeen and again at nineteen. She was in bed three months after the second attack, and since then had suffered from palpitation, dyspnœa, severe headache, vertigo, dyspepsia, and pain over the region of the heart and down the left arm, on the slightest exertion. When I first saw her she was very thin, anæmic, and cyanosed, and suffered from marked dyspnœa; her pulse was 92 per minute, and exhibited frequent intermittences, which proved to be due to premature ventricular contractions (Fig. 43).

The cardiac impulse could be seen and felt all over the left side of the chest, the apex-beat was diffuse

and forcible, in the left nipple line, the area of cardiac dulness was markedly enlarged, extending from just beyond the left nipple line, to $1\frac{1}{2}$ inches to the right of the middle line (Fig. 44, *AA*). A loud systolic murmur was heard all over the cardiac area and was conveyed into the left axilla and all over the left side of the back, indicating mitral regurgitation. The heart was evidently markedly

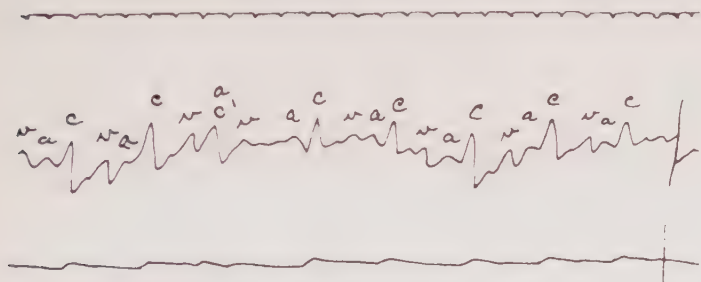


FIG. 43.—POLYGRAPHIC TRACING OF CASE XI., BEFORE TREATMENT, SHOWING PULSE OF VERY SMALL VOLUME, AND IRREGULARITY DUE TO PREMATURE VENTRICULAR CONTRACTIONS (*c'*) OCCURRING SIMULTANEOUSLY TO THE AURICULAR CONTRACTIONS; PULSE 100 PER MINUTE.

dilated and somewhat hypertrophied. The blood-pressure was 100-140 mm. Hg.

As the patient had been treated by rest and cardiac tonics for two years, I advised a course of "Nauheim" baths, which she took under my care in London. The headaches and palpitation began to improve from the first, and at the end of the treatment she was better in all ways, the palpitation was much less and the dyspepsia much better. The pulse was regular, less rapid, and of much better

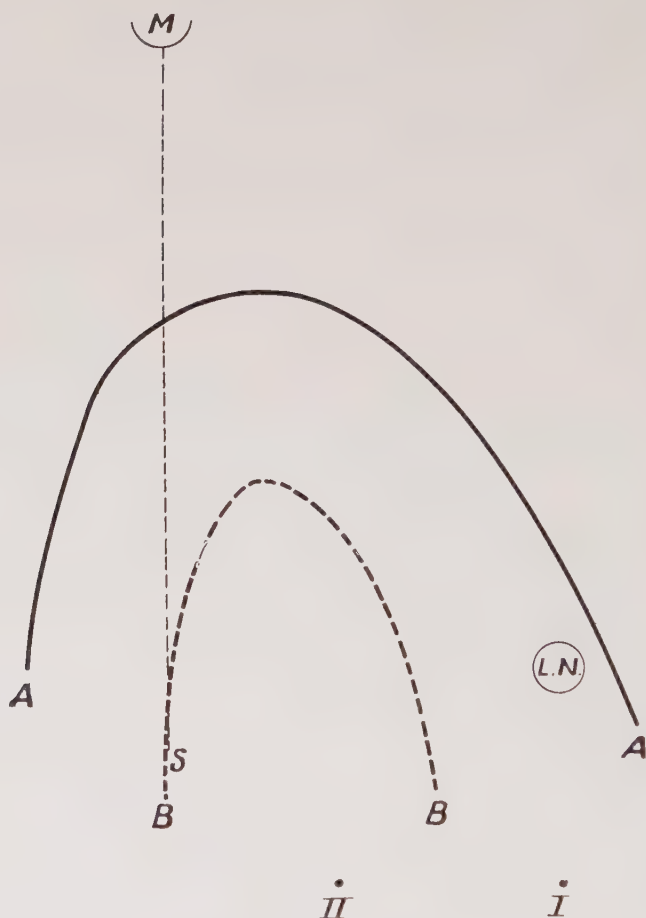


FIG. 44.—CASE XI.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat before treatment; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternum.

volume (Fig. 45). Before treatment the pulse had been 92 sitting and 130 standing, after treatment it was 84 sitting and 96 standing.

A month after treatment the patient wrote to me saying she was much better in all ways, was eating and sleeping well and had put on flesh. Fifteen

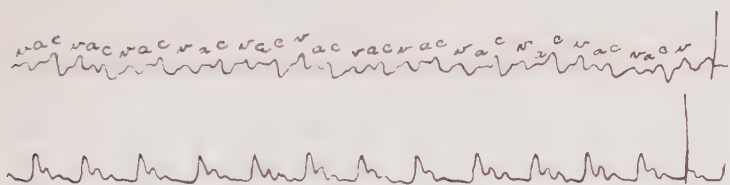


FIG. 45.—POLYGRAPHIC TRACING OF CASE XI., AFTER TREATMENT, SHOWING REGULAR PULSE OF MUCH IMPROVED VOLUME.

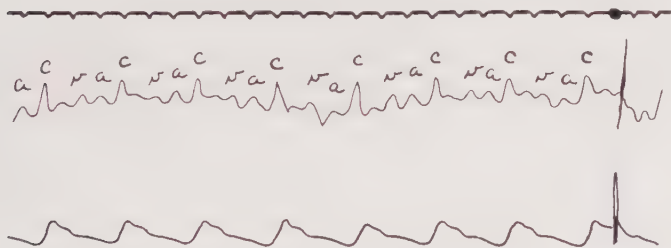


FIG. 46.—POLYGRAM OF CASE XI., THREE YEARS AND NINE MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME.

months after treatment I saw the patient again; she was in every way improved in health, had put on over half a stone in weight, and could go about and enjoy life; the pulse was still absolutely regular and of good volume.

Three years and nine months after treatment the pulse was still quite regular and of good volume (Fig. 46).

Three months after polygram No. 46 was taken she had to have her appendix removed. She stood this operation splendidly. Six years after treatment I examined her again, the cardiac dulness was normal, the pulse was regular, and she was enjoying good health.

CASE XII.—The patient, an extremely tall and thin young man, height 6 feet 4½ inches, aged twenty-seven

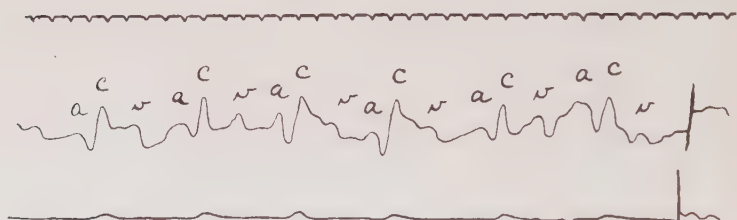


FIG. 47.—POLYGRAM OF CASE XII., BEFORE TREATMENT, SHOWING PULSE OF VERY SMALL VOLUME AND NORMAL *a-c* INTERVAL.

years, had been suffering from palpitation and pain for eighteen months before I saw him; during this period he had fainted several times, and had been kept in bed for three weeks on three separate occasions. He had just had three weeks in bed when I first saw him. He was thin and pale, weighed 11 stone, and looked ill. He said that he felt much palpitation and pain over the cardiac area, and was very short of breath if he tried to walk up the slightest incline.

His pulse was 61 per minute, regular in time and of very small volume (Fig. 47).

The area of cardiac dulness was much enlarged, extending from the left nipple, to an inch to the right of the middle line, and measuring 5 inches across at the nipple line (Fig. 48, *AA*). The apex-beat was somewhat diffuse and was felt just outside the

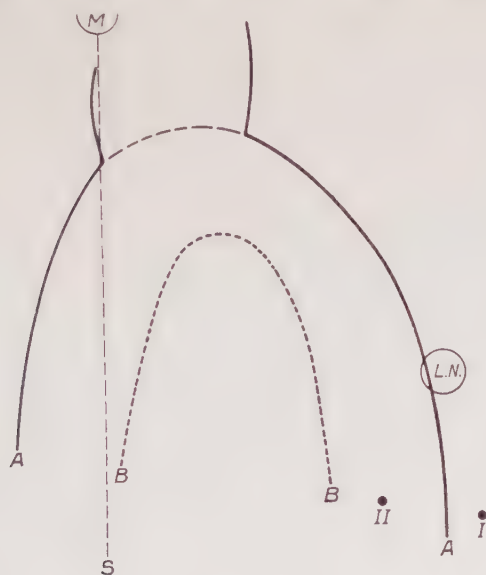


FIG. 48.

AA, area of cardiac dulness, Case XII., before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternal line.

nipple line (Fig. 48, *I*). A marked systolic murmur was heard at the apex and was conveyed into the axilla. His blood-pressure was 80-155 mm. Hg. He had had scarlet fever and measles, both badly, as a child.

He had a five weeks' course of "Nauheim" baths and improved steadily. At the end of the treatment, he had entirely lost the pain and palpitation and had not felt faint all the time. His pulse was of much better volume (Fig. 49).

The area of cardiac dulness was normal, extending from 1 inch inside the nipple line, to the left border of the sternum, and measuring $2\frac{1}{4}$ inches across at the nipple level, the apex-beat was 1 inch inside the

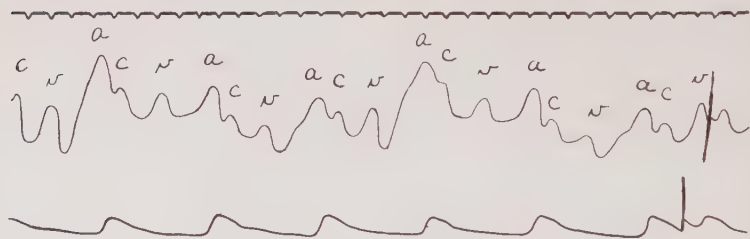


FIG. 49.—POLYGRAM OF CASE XII., AFTER TREATMENT, SHOWING PULSE OF MUCH IMPROVED VOLUME.

nipple line (Fig. 48, *BB*, *II*). The murmur was still heard over the apex, and was conveyed into the axilla. The case was undoubtedly one of mitral regurgitation in which the heart-muscle had broken down and dilated, under the strain of extra work, due both to the mitral disease, and the patient's unusual height. Directly the dilatation was cured and the cardiac muscle well contracted down, he lost all painful and dangerous symptoms. His blood-pressure at the end of his course was 60-120 mm. Hg.

I have seen this patient five or six times in the last five years since his course. His heart has remained

well contracted, he has felt quite well and has been able to play tennis and ride a motor-bicycle. He has not required any further treatment of any sort.

It is necessary to give several examples of cases in each class of cardiac disease dealt with, so as to show the large field of usefulness of the treatment, as individual cases differ so greatly in age, symptoms, and degree of disease.

FATTY HEART.

A marked, general, and steady increase in the weight of the whole body is always accompanied, or followed by, fatty degeneration or infiltration of the heart, and it is impossible for the obese person to have a healthy heart. No hard-and-fast line can be drawn between degeneration and infiltration, as these conditions are each caused by a deoxygenated blood-supply, and are so intimately connected that they cannot be satisfactorily separated in clinical investigations. The fatty heart is very easily fatigued and consequently dilates very readily, and it is therefore not surprising to find that in some cases of fatty dilated heart, the blood-pressure is not abnormally high, and that the heart has given way under a normal or even subnormal tension; but as a rule the tension is raised, though not to a great extent. As fatty degeneration slowly increases, the patient gives up first one and then another form of exercise, and ultimately is unable to walk more than a short distance

with comfort, on account of the dyspnœa arising from a dilated and fatty heart, and an increasing bulk. As time advances all the organs become congested, the bowels, stomach, and liver cease to perform their functions perfectly, and the lungs become subject to a chronic catarrhal condition, accompanied by attacks of cardiac asthma, which cause great distress and prevent the patient from sleeping in the recumbent position; and palpitation and cardiac pains follow on any exertion.

It takes many years for those suffering from this malady to get into the above condition, but the very slowness and insidiousness of its advance is a danger, as the patient, who is usually approaching, or past middle age, gradually accommodates himself or herself to the altered conditions, and begins to regard them more as a necessary accompaniment of advancing years, than as a disease which can be first alleviated and then kept in check, by suitable treatment.

When, in time, the symptoms become irksome and painful, an effort is often made to improve matters by a rigid diet, or, worse still, by indulgence in violent exercise. If the first line of treatment is adopted the weight will probably be reduced, whilst a strict rule of diet is adhered to, but the health will be rendered worse rather than improved, as this class of patient does not possess the physical stamina necessary to withstand, either an entire alteration in diet, or a modified starvation. If the second line of treatment is adopted, the heart's action

is further impaired and the severity of the symptoms is increased, with often a fatal result.

The administration of drugs, such as thyroid extract, is not free from danger, and many cases have been made seriously ill by this method of treatment, although thyroid is extremely useful as an aid to reducing weight, after the heart and circulation have been restored to a normal condition.

The only treatment that is logical and likely to benefit such cases, is one that will so improve the circulation that the cardiac muscle itself benefits by a purer and better oxygenated blood-supply. It is thereby strengthened, the process of degeneration stopped; and later, when the better circulatory conditions are well established, the degenerate tissue is, to some extent, replaced by healthy heart-muscle. One ventures to suggest that even this latter great improvement may take place, on the strength of the steadily advancing condition into good health of such patients, treated by the "Nauheim" methods; and the fact that several years after treatment a good proportion of those treated are in excellent health and are able to lead strenuous lives, whereas they were great invalids, with apparently, at most, a few years of life left, before they underwent treatment.

The dietary in these cases is not restricted as to quantity, either as regards solid or fluid, but they are warned to eat as sparsely as possible, because they are usually hearty eaters. Carbohydrates are reduced to a minimum, well-cooked toast is given instead of

bread, sugar and potatoes are forbidden, sweets are limited to custard, jelly, junket, or stewed fruit; and fluid is only allowed after meals; as a much larger meal can be eaten if helped down with fluid, at intervals.

If the patient will adhere to this dietary, which is by no means severe, and allows plenty of variety, both during and after treatment, the benefit derived from the course will be maintained for many years, and the weight will gradually decrease, as healthy tissue replaces fat, on account of an improved circulation (Case XIV.). If, on the other hand, the patient will not abstain from any class of food for long, but returns to a richly farinaceous and carbohydrate diet, directly the symptoms are better and the weight is reduced, then further treatment will be required at intervals (Case XIII.).

CASE XIII.—The patient, a lady, fifty-eight years of age, consulted me on account of great stoutness, dyspnœa, bronchial catarrh, palpitation, and increasing œdema of the legs. She was somewhat cyanosed, markedly obese, weighing 18 stone, and was 5 feet 10 inches in height; her dyspnœa, even on the slightest exertion, was marked, and she could not walk except at a slow pace and for a short distance. The legs were decidedly œdematous up to the knees, pitting fairly deeply on pressure. Her pulse in the upright position was 96 per minute, regular in time and volume, and of small volume; her blood-pressure was 75-150 mm. Hg. Her area of cardiac dulness was much enlarged, extending

from 2 inches outside the left nipple line to 3 inches to the right of the mid-sternal line (Fig. 52, *AA*); the cardiac sounds were heard very faintly at the apex, but were not audible over the base of the heart. There was no albumen or sugar in the urine. The polygraphic tracing (Fig. 50) showed, in the venous curve, an *a-c* interval slightly *longer* than the normal, and in the radial curve a regular pulse of small volume, and 70 per minute, in the recumbent position. This patient had a course of twenty-five baths, extending over a period of five weeks. At the conclusion of the treatment, her weight was 15 stone 12 pounds, having dropped 2 stone 2 pounds in the five weeks. She was of a good colour, the dyspnœa was decidedly less marked, and she could take fairly lengthy walks of one or two miles' extent. There was no œdema of the legs, and the bronchial catarrh was much less troublesome. The pulse was 90 in the erect, and 68 in the recumbent position. The area of cardiac dulness was markedly less, extending from 3 inches inside the left nipple line, to the mid-sternal line (Fig. 52, *BB*). The position of the breast, which was large, had somewhat altered by the loss of weight, so that the nipple was not exactly in the same position, and the area of cardiac dulness had not decreased quite so much on the left as would appear from the measurements. The area of cardiac dulness was, however, about normal. The cardiac sounds were much stronger and could be well heard both at the apex, and over the base of the heart; no murmur

was audible at any time during treatment. The blood-pressure was 80-130 mm. Hg., having fallen 20 mm. since the commencement of the treatment. Fig. 51, a polygraphic tracing taken at the end of the course, shows, in the venous curve, an *a-c* interval which is quite normal, and in the radial curve

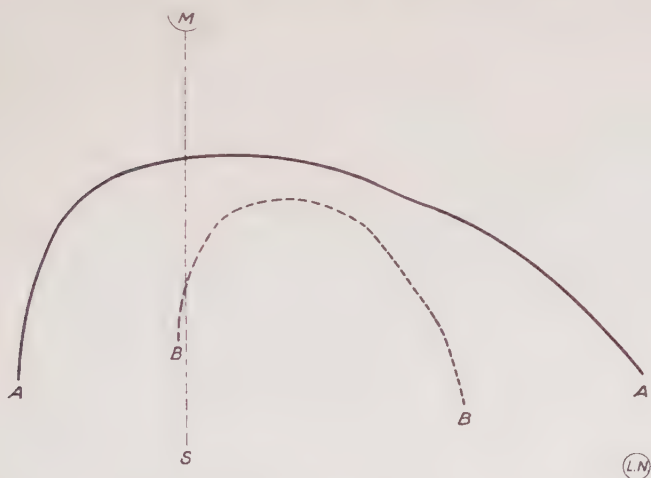


FIG. 52.—CASE XIII.

A.A., area of absolute cardiac dulness before treatment; *B.B.*, area of absolute cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

a pulse of much improved volume and slower rate. The symmetry of the tracing is spoilt by the pens meeting at times, but the middle portion is clear.

This patient has been under my observation for thirteen years. During that period she has had four courses of baths, as, on account of her appetite being large, it was not possible to regulate her diet properly,

and she consequently tended to put on flesh and develop cardiac symptoms about a year or eighteen months after treatment. By means of this treatment her weight has been kept down, between 15 and 16 stone, and she has been able to lead a comfortable and fairly active life, walking from two to four miles a day. Had she been able to keep to a strict diet after the first course, I do not believe she would have required further treatment for a long period.

For the last five years she has kept well without any further treatment, and her weight has kept at about 16 stone.

CASE XIV.—The patient, a lady aged fifty-one years, had, for five or six years before she saw me, been putting on weight and suffering from indigestion, shortness of breath, and palpitation; she could only go upstairs with difficulty, and never walked more than a few hundred yards on account of dyspnoea on exertion; as her symptoms were getting steadily worse she consulted me. She was very stout, pale, flabby, and anæmic, her height was 5 feet 3 inches, and her weight 12 stone 6 pounds. Her blood-pressure was 90-150 mm. Hg. Her father had died of apoplexy at the age of fifty, and her mother of nephritis at the age of thirty-six, so there was a definite family history of circulatory trouble. The pulse was of fair volume, 82 per minute, and the heart-sounds were clear. The area of cardiac dulness was greatly increased, measuring 9 inches across and extending from $1\frac{1}{2}$ inches outside the left nipple line

to $1\frac{1}{2}$ inches to the right of the mid-sternal line (Fig. 53, *AA*).

I gave this patient a five weeks' course of baths. Her health did not improve much during the course, and she only lost 6 pounds in weight, but she was able to walk a mile with comfort, lost the palpitation

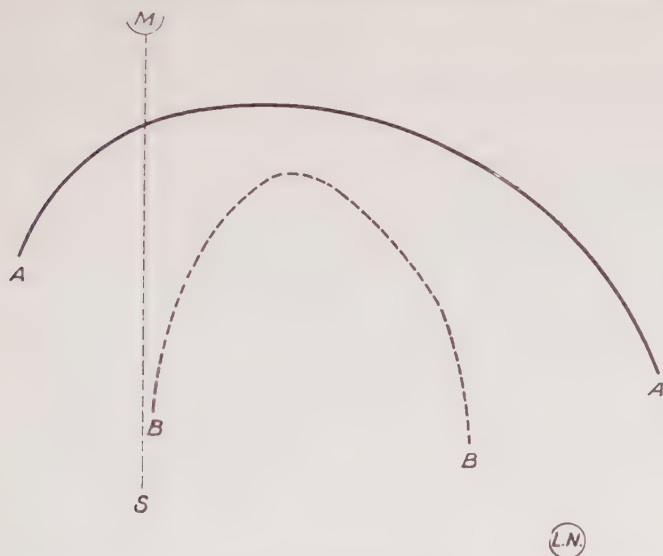


FIG. 53.—CASE XIV.

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *LN*, left nipple; *MS*, mid-sternum.

and a good deal of the dyspnœa, and had a better colour. The area of absolute cardiac dulness was greatly reduced, measuring only $4\frac{1}{2}$ inches across, and extending from $1\frac{1}{2}$ inches inside the left nipple line, to $\frac{1}{2}$ inch to the left of the middle line (Fig. 53, *BB*). Her blood-pressure was 80-120 mm. Hg

She returned home to North Wales and wrote to me a month later, saying that she was continuing to improve in health, had not felt so well for several years, and was losing about 1 pound in weight a week, her weight then being 11 stone 9 pounds. I heard from this patient occasionally that she was keeping in good health, that the weight was keeping down, and that she could walk several miles with comfort. Two years and three months after treatment she wrote to me saying she was in excellent health and weighed 10 stone 9 pounds, nearly 2 stone less than before treatment.

I saw her seven years after treatment, she was in excellent health living a strenuous life, her cardiac dulness was normal and her weight 10 stone 12½ pounds. She was fifty-eight years of age.

CHAPTER V

INFLUENZAL MYOCARDITIS AND OTHER TOXÆMIAS

THE dilated, enfeebled, irritable, and often irregularly-acting heart, with damaged nodes or bundles, a sequela of influenza, is one of the most common forms of cardiac disease that is met with to-day. It is also one that responds excellently to the "Nauheim" treatment, though in many instances it resists treatment by rest, drugs, or change of air, so that the unfortunate sufferer often becomes a chronic invalid, with nothing but a broken and useless life to look forward to. Many of these cases are restored to perfect health by the "Nauheim" treatment, after months of change of air and rest in bed, or on the sofa, have done little or no good. If they are of a severe type they may require two courses, with an interval of a year or eighteen months between them to restore them to health. In the case of patients of advancing years, who in addition to having had severe influenza, suffer from some chronic disease such as rheumatism, arterio-sclerosis, or gout (Case XV.), it is often necessary to repeat the treatment several times at various intervals; but in the case of moderately young patients who suffer from no chronic

disorder, one course of treatment is often sufficient (Case XVII.).

Toxæmia.—All cases of cardiac toxæmia, or enfeeblement, caused by prolonged illness of any kind, such as typhoid, malaria, pneumonia, or multiple abscesses, belong to this group, and constitute a class in which the baths are a most valuable aid to such methods of cure as vaccines, rest, tonics, and change of air; a much more rapid return to health being obtained in this manner than could otherwise be expected, especially if cardiac dilatation and intermittent pulse are present, as in Case XVII.

CASE XV.—The patient, a man aged sixty-seven years, had had several attacks of influenza and suffered from palpitation and cardiac pain; he had also had several attacks of faintness, and a week before he saw me he had suddenly fallen down in a faint, and had not recovered consciousness for some time. When I first saw him his heart was markedly dilated, the area of absolute cardiac dulness extended from the left nipple line to $1\frac{1}{2}$ inches to the right of the middle line, and measured 6 inches across at the nipple level (Fig. 56, *AA*). His pulse varied from 46 to 60 per minute, and exhibited occasional premature auricular contractions (Fig. 54).

His blood-pressure was 70-133 mm. Hg., and his bloodvessels were remarkably healthy for a man of his age; the urine was normal. The heart-sounds were quite clear but somewhat weak. He took a course of twenty-five "Nauheim" baths in his own

home, and his general health and the physical signs steadily improved. At the end of the course, which extended over five weeks, the area of absolute cardiac dulness extended from 1 inch inside the left nipple line, to the mid-sternal line, and measured $3\frac{1}{2}$ inches

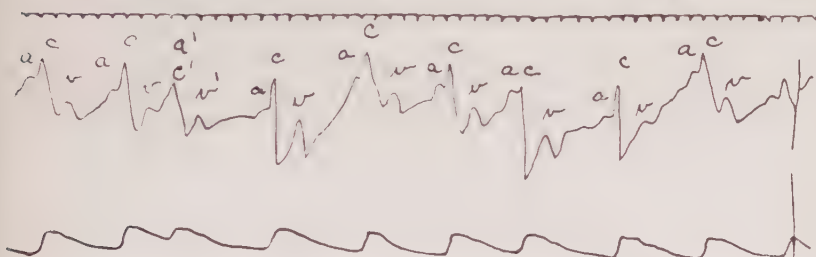


FIG. 54.—POLYGRAPHIC TRACING OF CASE XV., BEFORE TREATMENT, SHOWING A PULSE OF SMALL VOLUME AND ONE EXAMPLE OF THE PREMATURE AURICULAR CONTRACTIONS ($a'c'v'$).

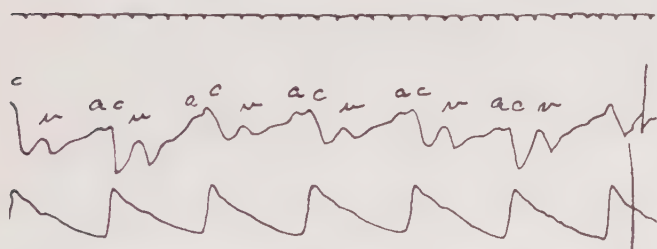


FIG. 55.—POLYGRAPHIC TRACING OF CASE XV., AFTER TREATMENT, SHOWING A PERFECTLY REGULAR PULSE OF GOOD VOLUME.

across at the nipple level, a decrease of $2\frac{1}{2}$ inches (Fig. 56, *BB*). The pulse was quite regular and of much larger volume (Fig. 55), and the blood-pressure was unaltered.

He continued to enjoy good health for about one year after treatment, but then began to suffer again from palpitation and faint feelings, and as the area

of cardiac dulness was distinctly larger than after treatment I gave a second course of baths. This

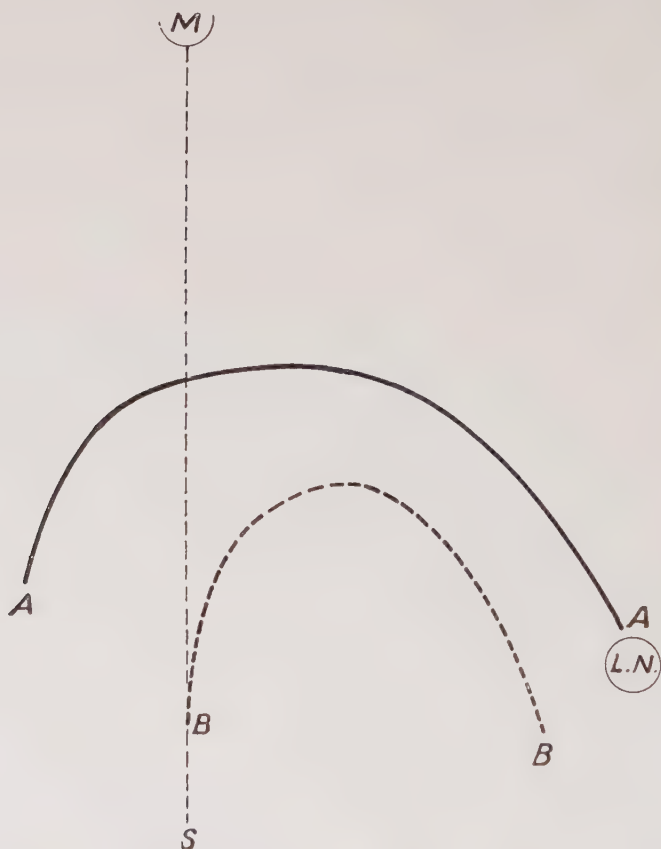


FIG. 56.—CASE XV.

AA, area of absolute cardiac dulness before treatment; *BB*, area of cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

patient is now eighty years of age and has been under my care for thirteen years, during which time he

has had nine courses of baths, the latter ones being only of three weeks' duration. He is hale and hearty, can take long walks, digs in his garden, and enjoys life, but about twelve to eighteen months after a course of baths he begins to have a return of the symptoms, and requires further treatment. It is now twenty-one months since his last course and he has not shown any signs of returning symptoms yet, although he had a severe attack of influenza a few months ago. He is of a markedly gouty constitution, has had several attacks of gout, and has suffered from sciatica, lumbago, influenza, and neuritis. Cases of this kind, when somewhat advanced in age, often require to repeat the course at intervals, so as to periodically eliminate toxic materials which accumulate in the system, and cause self-poisoning and, a return of troublesome symptoms.

CASE XVI.—The patient, a man aged forty-seven years, consulted me on account of palpitation, irregular heart's action, and an increasing inability to carry on any physical exercise. He had had pneumonia twice when a boy, pleurisy at the age of twenty-six, and a severe attack of influenza three months before I saw him. Before he felt his heart he had been used to leading a vigorous, athletic life, hunting, shooting, etc., but had not been able to do so for four years before he saw me. The patient was pale and puffy, his pulse was small in volume with constant intermittence, due to premature auricular contractions (Fig. 57).

The heart sounds were clear, the blood-pressure was 80-120 mm. Hg.; the area of cardiac dulness was considerably enlarged, extending from $\frac{1}{2}$ inch to the left of the left nipple, to the right border of the sternum, and measuring 5 inches across at the nipple level; the apex-beat was 1 inch outside the nipple line (Fig. 58, *AA*).

I treated the patient with tonics, and he led a very easy life for twelve months, but at the end of this

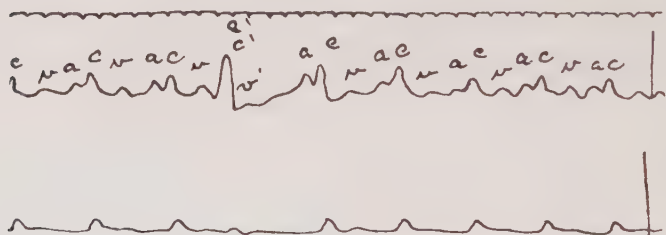


FIG. 57.—POLYGRAPHIC TRACING OF CASE XVI., BEFORE TREATMENT, SHOWING EXAMPLE (*a'c'v'*) OF PREMATURE AURICULAR CONTRACTION, AND PULSE OF SMALL VOLUME.

period his health was about the same, so I advised a course of "Nauheim" baths; he took these under my care in a London hotel, and almost from the first began to improve in health, and lose the heart symptoms. At the end of the course his pulse was quite regular and of decidedly better volume (Fig. 59). The area of cardiac dulness was normal, measuring $3\frac{1}{4}$ inches across at the nipple level, as compared with 5 inches before treatment, and extending from 1 inch inside the left nipple, to the middle line; the apex-beat was just in the nipple line. I saw this patient

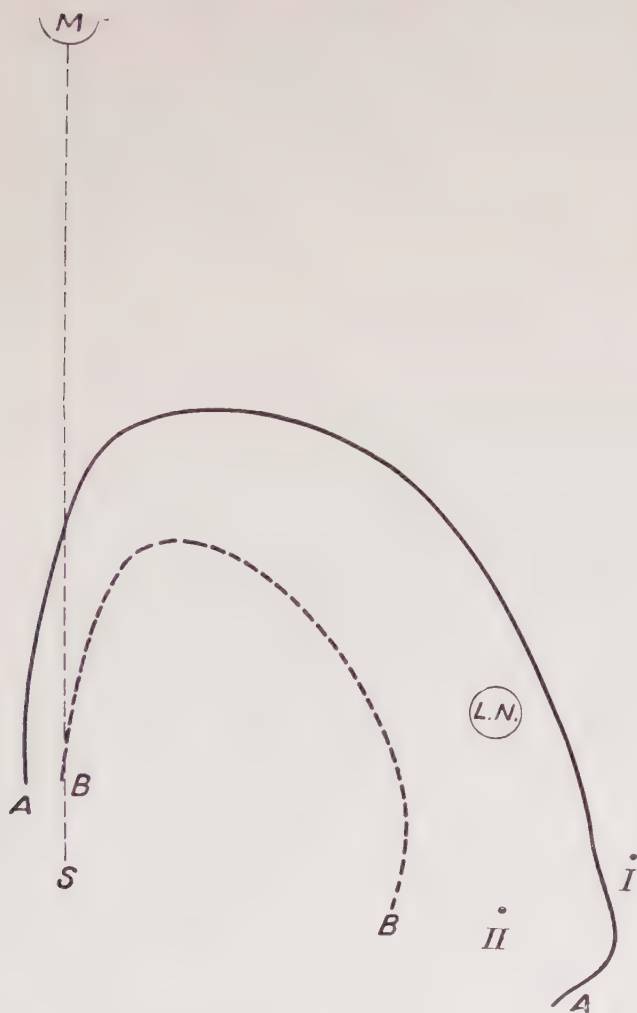


FIG. 58.—CASE XVI.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple

fourteen months after treatment; he felt and looked well, was of good colour, and able to enjoy a normal life, and hunt and shoot, his pulse was of fair volume and regular in time (Fig. 60), and the area of cardiac dulness was unaltered.

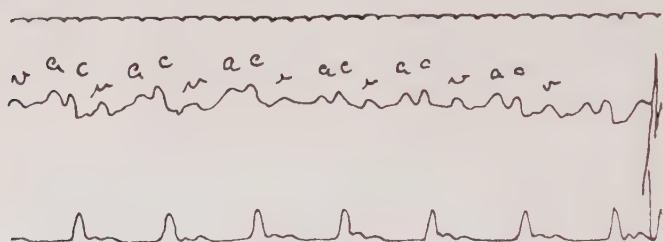


FIG. 59.—POLYGRAPHIC TRACING OF CASE XVI., AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME.

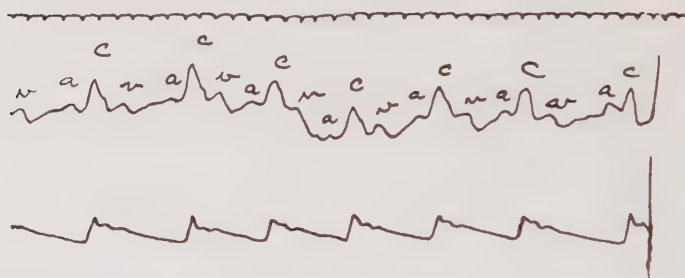


FIG. 60.—POLYGRAPHIC TRACING OF CASE XVI., FOURTEEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME.

Seven years after treatment he was still in excellent health and was able to hunt and shoot and lead an absolutely normal life.

CASE XVII.—The patient, a lady aged thirty-eight years, had never had any serious illness till two years before I saw her; she then had a severe attack of

influenza. Ever since that time she had slept badly, suffered a great deal from palpitation, always felt tired, constantly had vertigo, and had had several fainting attacks, and her feet and hands had been swollen. She had tried long periods of absolute rest, but directly she began to get about again her symptoms returned, and she had therefore been a chronic invalid for all this period.

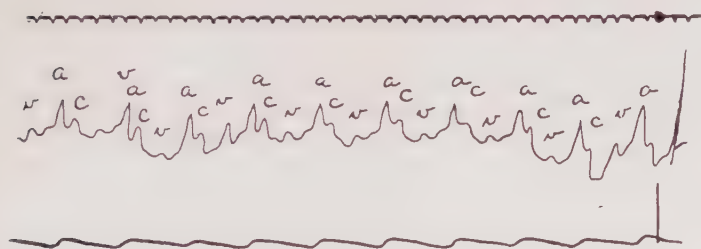


FIG. 61.—POLYGRAPHIC TRACING OF CASE XVII., BEFORE TREATMENT, SHOWING REGULAR PULSE OF VERY SMALL VOLUME, 68 PER MINUTE.

When I first saw her she was anæmic and thin and looked ill and drawn. Her hands were puffy and there was marked œdema of the ankles and feet. Her pulse was of very small volume, regular in time, 68 per minute, and felt soft (Fig. 61).

The area of cardiac dulness was markedly enlarged, extending from 1 inch inside the left nipple line, to 2 inches to the right of the sternum, and measuring $5\frac{1}{2}$ inches across at the nipple level, indicating much auricular dilatation (Fig. 62, *AA*). The apex-beat could not be felt, and the sounds were feeble, but there

was no cardiac murmur. The blood-pressure was 80-132 mm. Hg., and the urine was normal.

This patient had a five weeks' course of baths in a nursing-home. She began to improve almost at once, and at the end of the treatment she had quite lost

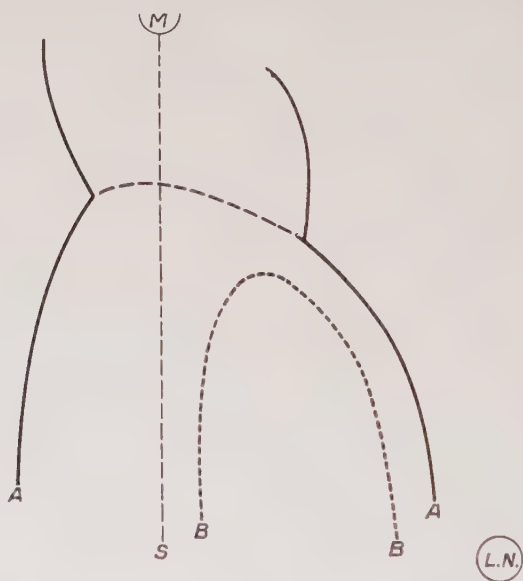


FIG. 62.

AA, area of cardiac dulness of Case XVII., before treatment;
BB, area of cardiac dulness after treatment; *MS*, mid-sternal line; *LN*, left nipple.

the insomnia, and slept well without any sedative. There was no œdema, and no palpitation, or vertigo, and she had not had a fainting attack all the time. She felt very much stronger. Her pulse was of very much improved volume (Fig. 63), 48 per minute. The blood-pressure was 80-120 mm. Hg.

The area of cardiac dulness was normal (Fig. 62, *BB*), and the sounds were much stronger.

This patient remained in perfect health, and when seen six years after treatment, was perfectly well and had had no return whatever of any of the symptoms.

Some medical men are of the opinion that the *rest* is what does patients good when they have a course

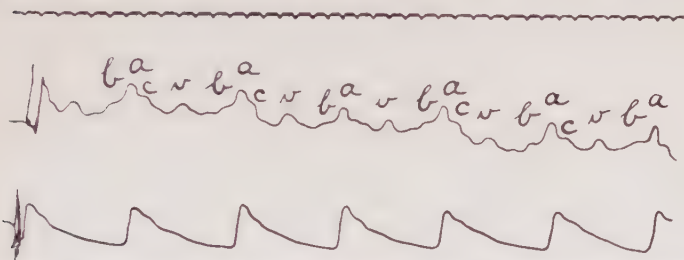


FIG. 63.—POLYGRAPHIC TRACING OF CASE XVII., AFTER TREATMENT, SHOWING REGULAR PULSE OF GREATLY IMPROVED VOLUME, 48 PER MINUTE.

of "Nauheim" baths, and they tell patients that a rest and change will do as much good as a course of baths. The above case is an illustration of how entirely erroneous such an opinion is, and as a matter of fact, it is usually held by those who have had no practical experience of the treatment. The treatment is given, in the vast majority of cases, to those who have tried rest, tonics, and change, for months or even years, and have found that directly they resume a somewhat normal life, the troublesome symptoms return. It is generally after a long trial of such treatment that they come under my notice.

Complete rest is not used during the "Nauheim" treatment, unless patients are too ill to get about at all, and even in these cases, outdoor exercise is given as soon as they are able to take it; so that in the ordinary course, patients would have much more exercise and less rest during a course of baths, than they get under a rest-cure and drug treatment.

OTHER TOXÆMIAS.

CASE XVIII.—The patient, a doctor aged forty-six years, had a severe attack of multiple abscesses, which was followed by a spell of very arduous work during the winter and spring. In the early summer, he began to suffer from general ill-health accompanied by constant cardiac irregularity, which caused great discomfort and insomnia. Treatment with bromides and digitalis relieved him for a time, but as he found the relief only temporary, and was not able to do his work, without great fatigue, he consulted me. He was suffering from a very dilated and weakened heart exhibiting constant irregularities. The absolute cardiac dulness extended from an inch outside the right border of the sternum, to the left nipple line, measuring at the level of the nipple 6 inches (Fig. 67, *AA*). The heart sounds were slapping at the apex, and scarcely audible at the base. The polygraphic tracing exhibited auricular premature contractions, but of so feeble a character that they did not reach the radial pulse (Fig. 64).

I started him on a course of twenty baths, and

after eight of these his pulse became quite regular and of improved volume (Fig. 65). The cardiac dulness was less, and he felt much better.

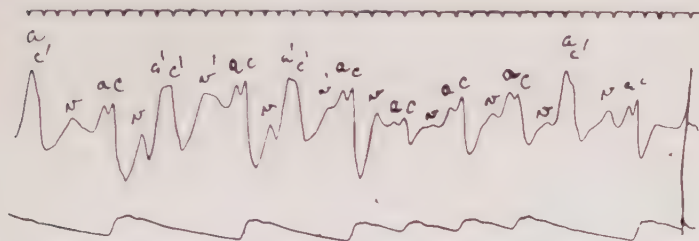


FIG. 64.—POLYGRAPHIC TRACING OF CASE XVIII., BEFORE TREATMENT, SHOWING AURICULAR (*a'c'v'*) PREMATURE CONTRACTIONS AND A PULSE OF POOR VOLUME.

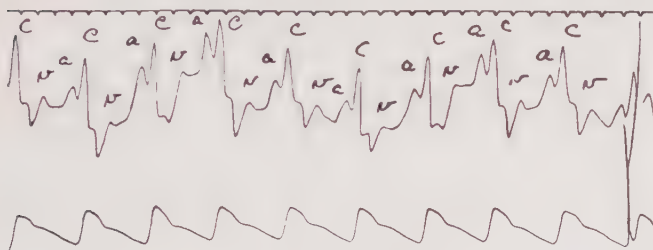


FIG. 65.—POLYGRAPHIC TRACING OF CASE XVIII., AFTER EIGHT BATHS, SHOWING A REGULAR PULSE OF IMPROVED VOLUME. RATE, 75 PER MINUTE.

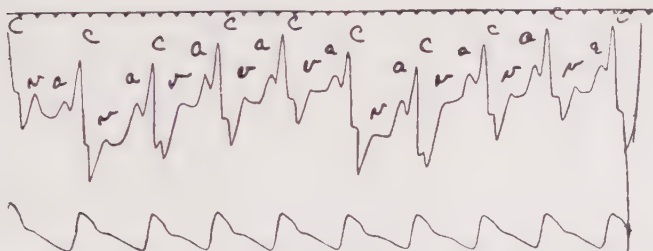


FIG. 66.—POLYGRAPHIC TRACING OF CASE XVIII., AFTER EIGHTEEN BATHS, SHOWING REGULAR PULSE OF GOOD VOLUME.

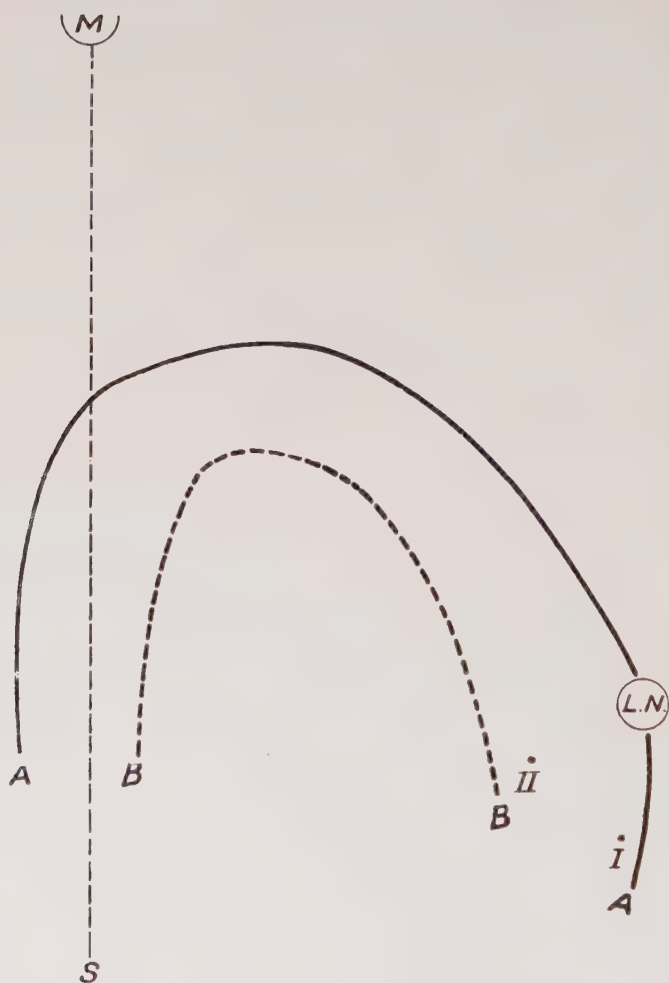


FIG. 67.—CASE XVIII.

AA, area of absolute cardiac dulness before treatment; *I*, apex beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

After twenty baths he felt quite well, and slept well; the polygraphic tracing showed a regular pulse of good volume (Fig. 66). The area of cardiac dulness extended from the left border of the sternum, to $1\frac{1}{2}$ inches inside the left nipple, measuring 4 inches across (Fig. 67, *BB*). The sounds at the apex were natural, and those at the base could be well heard.

The patient went away intending to take a month's holiday. He indulged in a good deal of golf, and returned to London and work in ten days, but he had over-exerted himself on his short holiday and had come back to town too soon, and consequently he had a relapse. After about ten days' work he was forced to take a month's rest, since when he has been perfectly well and able to work hard and play golf.

It is now over eight years since he had treatment, and during that time he has had constant arduous professional work, starting early in the morning and not ending till late at night, but despite this he has kept in good health during the whole of this period.

CASE XIX.—The patient, a lady aged forty-one years, had a fibroid of the uterus removed two years before I saw her. The wound from this operation suppurated for six months, and she began to suffer from palpitation, an exceedingly irregular heart's action, fainting attacks, and great weakness. She was seen by two cardiologists who both diagnosed auricular fibrillation, and put her on large doses of digitalis; unfortunately she proved unable to take

even a moderate dose of digitalis, as it brought on sickness and dyspepsia. For two years she had to have a nurse and to remain in bed till tea-time, and then get up on to a sofa, and even when she was leading this invalid life she was subject to attacks of palpitation, very irregular heart's action, and

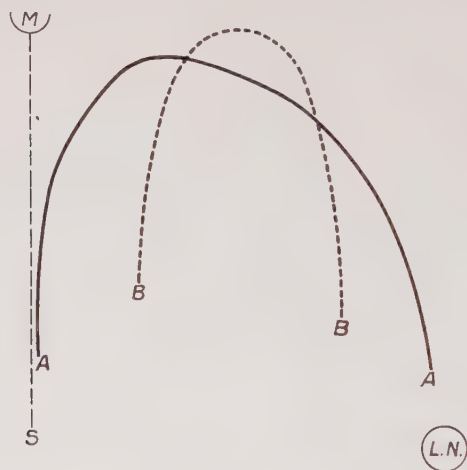


FIG. 68.—CASE XIX.

AA, area of cardiac dulness before treatment; *BB*, area of cardiac dulness after treatment; *LN*, left nipple; *MS*, mid-sternal line.

prostration. When I first saw her she looked very ill, was somewhat cyanosed, and had a very irregular pulse of exceedingly small volume and very irregular action. This irregularity proved to be caused by constant premature auricular contractions (Fig. 69). The apex-beat was in the nipple line, the first sound at the apex was accentuated, but the sounds at the

base were feeble. The area of cardiac dulness was enlarged, it measured 5 inches across just above the nipple level, and extended from the left nipple line, to the mid-sternal line (Fig. 68, *AA*). The blood-pressure was 80-140 mm. Hg., and the urine was normal. She slept very badly, and ate very little.

No medicines could be tolerated except a small dose of bromide at night. She started a course of baths in her own home and steadily improved in health, but she was so weak and so unaccustomed to any form of exercise that I was unable to get her out for a drive for about four weeks. She had a course of five weeks' duration, and at the end of that period was very greatly improved in health. She had not had any cardiac attacks, and her pulse was of fair volume, quite regular in time, 50 per minute (Fig. 70). Her cardiac dulness was normal, extending from $1\frac{1}{4}$ inches inside the left nipple line, to $1\frac{1}{2}$ inches to the left of the mid-sternal line, and measuring $2\frac{1}{2}$ inches across (Fig. 68, *BB*). The apex-beat was 1 inch inside the nipple line, and the cardiac sounds were much clearer and stronger. She had entirely lost all her cardiac symptoms. Her blood-pressure was 75-125 mm. Hg. Two months after treatment she was able to be up all day and go out for walks, and two months later she was leading a perfectly normal life and has been doing so ever since. It is now just a year since she had treatment.

CHAPTER VI

HEART-STRAIN

IN the fifth edition, this chapter was headed "*Soldier's Heart and Heart-Strain.*" I then said that a patient suffering from "soldier's heart" was simply a military man who had undergone excessive mental or physical strain, or a combination of both, and whose heart had broken down under that strain. The expression "soldier's heart" was, however, in common use at that time, and was moreover believed by some to have a definite entity of itself, so that it seemed better to give the chapter the double title. The opinion that I then expressed is now the accepted view of the profession, and it is therefore no longer necessary to use a double title. During the Great War I had under my care a number of officers, all youngish men, who had been invalided from active service on account of cardiac breakdown. These patients, without exception, had been passed for service as physically sound, but on careful inquiry, a history of former heart trouble was always obtained; such as a strain in school athletics, necessitating a long rest and an abandonment of all games for the time, or an attack of rheumatism or rheumatic fever in childhood. Some similar history can always be

found in any civilian or soldier who has a cardiac breakdown in consequence of physical or mental over-strain. Personally I have never seen a case in which an absolutely normal heart has given way in this manner; that is to say, a case in which there has not been a very definite history of a previous illness, or a well-marked hereditary tendency to cardiac weakness.

In most of these cases, if seen early in the breakdown, the only signs of abnormality of the heart are, slight cardiac dilatation, indicated by an impaired resonance to the right of the left border of the sternum, cardiac irritability and instability, marked sinus arrhythmia, and a condition of general debility and exhaustion, causing the patient to be incapable of any sustained effort, either of body or mind, despite the fact that he has usually had a period of rest from work, of some duration.

Under treatment the cardiac dilatation has disappeared, the patient has recovered from the condition of exhaustion and debility, has been able to take moderate exercise with enjoyment, and gradually to resume his ordinary habits, and to return to his work. The sinus arrhythmia has usually become less marked, but has generally persisted to a certain extent, and I am therefore led to believe that this arrhythmia was not a new development, but that it had probably been present for a long period.

Since the invention of the polygraph and the electrocardiograph, it has become possible to classify

the irregularities of the heart's action, and to distinguish those which are of serious import, from those which are comparatively harmless. Before the introduction of these instruments, cardiac irregularity of any kind was always regarded with grave suspicion, for it was not then possible to differentiate with any certainty between the various forms of irregularity.

The careful physician, knowing that he was treading on uncertain ground, had to be guarded in his prognosis, and on the safe side in his treatment, in any case in which the normal regularity of the heart-beat was affected. In consequence, many cases, especially amongst children, were condemned, unnecessarily, to a very restricted and unhealthy life.

The pendulum has now swung in the opposite direction, and many cardiologists maintain that certain irregularities, especially those which are due to vagus influence, can be disregarded, both from the point of view of prognosis and treatment. This attitude is the natural result of the realization that the teaching of the past on this subject was faulty, but it does not allow for the facts that these new methods of investigation are of comparatively recent date, that the effects of cardiac irregularities are often not apparent for years after their development, and that they often lie dormant till some extra strain on the muscular or nervous system, brings them suddenly into prominence.

I am convinced, from observation of many cases,

both in adults and children, that the presence of any kind of irregularity in the cardiac rhythm is not the normal condition of a healthy cardiac mechanism, and that it should not be disregarded, even if it be one of the varieties of sinus arrhythmia. In all cases in which it is present, a careful inquiry into the previous history, and a detailed examination of the heart, to ascertain the presence or absence of dilatation, should be made, before it is set aside as a matter of no importance. From my own experience of the number of broken-down hearts, resultant of the war of 1914-18, in which no sign of abnormality could be found except sinus arrhythmia, I would never pass a heart which exhibited this abnormality, for any undertaking that involved prolonged and exceptionally severe strain, either of body or mind. It stands to reason that an organ which is working irregularly, whatever form that irregularity may take, is not in as satisfactory a condition as one which maintains a regular rhythm, and that although it may be perfectly fitted to carry an individual through the work of an everyday life, it will very probably give way under great strain.

Faught says,²⁷ "One of the earliest manifestations of myocardial change is the development of peculiarities of rhythm." F. A. Willius maintains that²⁸ "sinus arrhythmia occurs in individuals whose vagus mechanism is temporarily or permanently unstable,

²⁷ "Blood Pressure." Faught.

²⁸ "Clinical Electrocardiography." F. A. Willius.

and in whom nervous irritability permits otherwise inadequate stimuli to act. It may be remembered however that sinus arrhythmia *per se*, whilst not indicative of organic heart disease, may be associated with changes in the heart of a very serious nature."

Absolute rest, except in the acute stage of the breakdown, is not advisable. When the patient is able to get about at all, he should take as much walking exercise a day as he can do without feeling done up. Drugs seem to be of little or no use in these cases after a certain stage, in fact, they are often harmful.

Of the three following examples showing the effect of the "Nauheim" treatment upon cases of heart-strain, the first two are those of men who broke down in the war of 1914-18. They are typical examples of sinus arrhythmia, and the third is a civilian.

CASE XX.—Captain J., aged twenty-one years, was sent to me on March 23, 1916, by Dr. Arthur P. Luff, who informed me that the patient had been under his care, taking heart tonics and resting from work since January 26, 1916, and that, as his cardiac condition did not improve markedly, he had advised a course of "Nauheim" baths.

The history of the case is as follows: At eleven years of age he suffered from severe dilatation of the heart after a seven miles' paper-chase, was in bed eight weeks, and not allowed to play any games for three years. In July, 1915, he suffered from severe shell-concussion in France, was laid up in hospital for seven weeks, and then put on light duty; since

that time he had had seven medical boards, and had always been reported as only fit for light duty. In December, 1915, while out shooting, he was attacked with vertigo, collapse, and syncope, and shortly after this he consulted Dr. Luff.

When I first saw the patient on March 23, 1916, he looked in good health, his pulse in the recumbent position was 88, and in the erect 112, per minute, and was of marked sinus arrhythmia; his blood-pressure was 70-150 mm. Hg.; a blowing systolic murmur was heard over the aortic area on lying down, but was not heard in the erect position, and the first sound at the apex was reduplicated. The apex-beat was forcible, and just outside the left nipple line; the area of cardiac dulness extended from just inside the left nipple, to nearly 1 inch to the right of the mid-sternal line, and measured nearly 4 inches across at the nipple level (Fig. 71, *AA, I*).

A polygraph tracing (Fig. 72) showed a pulse of poor volume and of very marked sinus arrhythmia, the longest waves measuring 15 mm., as compared with 8 mm., of the shortest. It will be seen from the tracing that the *a-c* interval is normal and that the " *b* " wave is well marked in the long waves. (The " *b* " wave is caused by diastolic closure of the auriculo-ventricular valves at the end of the ventricular filling, the flow from auricle to ventricle is suddenly checked, and a reflex occurs into the jugular vein—the " *b* " wave.)²⁹

²⁹ "Explanation of ' *b* ' Wave." *Quarterly Journal of Medicine*, Dr. T. Davenport-Windle.

After a course of twenty-five "Nauheim" baths the patient felt well, had lost the feeling of exhaustion, and was able to take exercise with enjoyment. The polygraphic tracing (Fig. 73) taken after treatment shows a pulse of improved volume, but the sinus arrhythmia is still present, as well as the

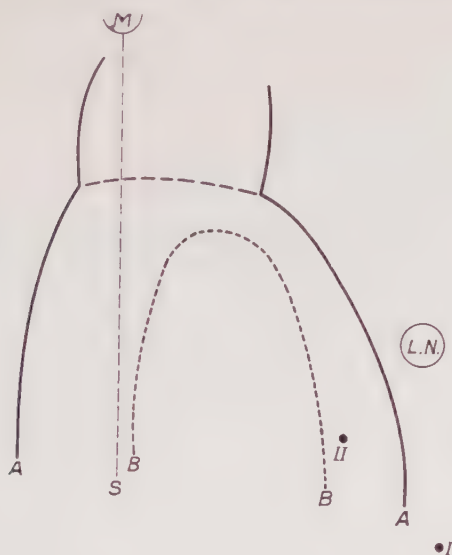


FIG. 71.—CASE XX.

AA, area of cardiac dulness before treatment; *I*, apex-beat;
BB, area of cardiac dulness after treatment; *II*, apex-beat;
MS, mid-sternal line; *LN*, left nipple.

"*b*" wave, in the longer beats. The area of cardiac dulness was normal, measuring about 2 inches across at the nipple level, and the apex-beat was 1 inch inside the nipple line (Fig. 71, *BB*, *II*). The blood-pressure was 50-115 mm. Hg., as compared with 70-150 mm. Hg. before treatment.

The sinus arrhythmia was not quite so marked as before treatment, the shortest pulse-waves being 10 mm. long, and the longest 15 mm., as compared with 8 and 15 before treatment; it was also not so constant

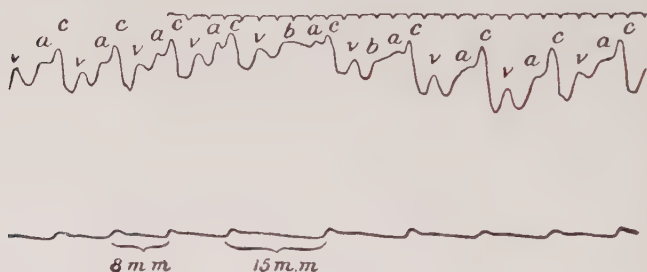


FIG. 72.—POLYGRAPHIC TRACING BEFORE TREATMENT, SHOWING VERY MARKED SINUS ARRHYTHMIA AND A PULSE OF POOR VOLUME (CASE XX.).

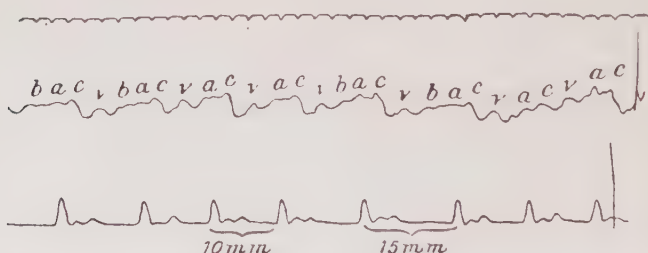


FIG. 73.—POLYGRAPHIC TRACING, SHOWING IMPROVED VOLUME OF THE PULSE, BUT PERSISTENT SINUS ARRHYTHMIA (CASE XX.).

A few months later he was able to return to military duties.

At the present time, six and a half years after his course of baths, this patient writes to tell me he has been perfectly well ever since the treatment, and has been able to lead an ordinary life.

CASE XXI.—Captain L., aged thirty years, consulted me in March, 1916. He had scarlet fever in 1907, followed by rheumatic fever. On December 28, 1915, he suffered from severe shell-shock, followed by an attack of rheumatism early in January, 1916;

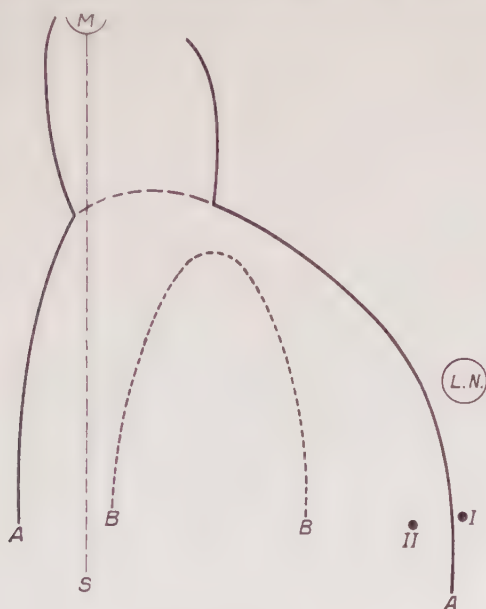


FIG. 74.—CASE XXI.

AA, area of cardiac dulness before treatment; *I*, apex-beat; *BB*, area of cardiac dulness after treatment; *II*, apex-beat; *LN*, left nipple; *MS*, mid-sternal line.

since which time he had been laid up entirely. When I first saw the patient, he looked pale and flabby, he was incapable of any exertion, and could only move about his bedroom with the aid of two sticks, for the left leg and thigh were very stiff from rheumatism,

and any movement caused palpitation. The area of cardiac dulness was enlarged, measuring 5 inches across at the nipple level, and extending from just inside the left nipple, to the right border of the sternum; the apex-beat was just felt in the nipple line (Fig. 74, *AA, I*), the cardiac sounds were weak, but no murmur was present; the pulse was 96 per minute in the prone position, and 108 in the erect;

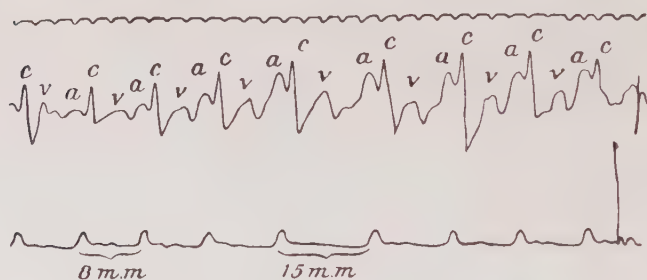


FIG. 75.—POLYGRAPHIC TRACING BEFORE TREATMENT, SHOWING SINUS ARRHYTHMIA AND POOR VOLUME OF PULSE (CASE XXI.).

the blood-pressure was 70-105 mm. Hg. A polygraphic tracing (Fig. 75) showed a pulse of poor volume and of marked sinus arrhythmia, the longest wave measuring 15 mm. and the shortest 8 mm. The patient had been in bed for two months, and had had several weeks' massage, with only slight improvement of the stiffened limb; he was stiff in his neck and back, but there were no joint lesions.

I advised a course of modified "Nauheim" baths, resembling the "Nauheim" baths in constituents, but at a higher temperature, on account of the rheumatism, and he went into a nursing-home for

that purpose. After a course of twenty-five baths, extending over five weeks, he could walk about comfortably, without sticks, but with a slight limp. The area of cardiac dulness was normal, measuring about 2 inches across on the nipple level, and the apex-beat was 1 inch inside the nipple line (Fig. 74, *AA, II*); the rate of the pulse was 80 in the prone position and 92 in the upright position. The blood-pressure was

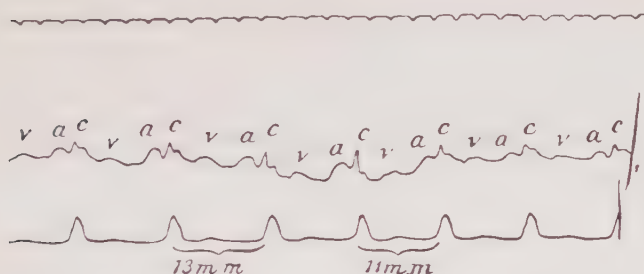


FIG. 76.—POLYGRAPHIC TRACING AFTER TREATMENT, SHOWING PULSE OF IMPROVED VOLUME AND SLOWER RATE, THE SINUS ARRHYTHMIA BEING STILL PRESENT IN A LESS DEGREE (CASE XXI.).

unaltered. The polygraph tracing (Fig. 75) shows a pulse of slower rhythm and improved volume. The sinus arrhythmia is still present, but is not so marked, the longest wave being 13 mm., and the shortest 11 mm., as compared with 8 and 15 mm. before treatment.

A few months later he was able to return to military duties.

One year and two months later he wrote to me that he was hard at work and quite well; since that

time I have not been able to trace him, as he wrote from a military camp and has now left the army and I do not know his address, but I should probably have heard from him if he had had a relapse.

CASE XXII.—The patient, a big heavy man, aged thirty-five years, weighing 14 stone 6 pounds, a male nurse by profession, nursed a paralyzed patient weighing 23 stone for five years, and for the latter three years of this time he had been troubled with

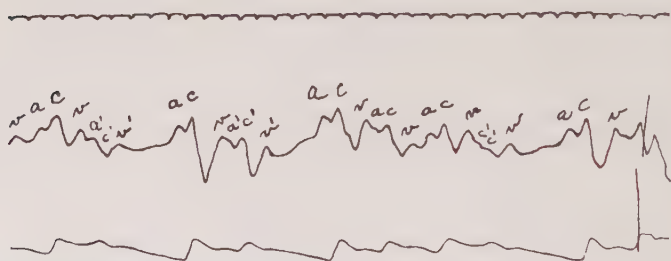


FIG. 77.—POLYGRAPHIC TRACING OF CASE XXII., BEFORE TREATMENT, SHOWING THREE EXAMPLES (a'c'v') OF PREMATURE AURICULAR CONTRACTION.

palpitation, irregular cardiac action, pain over the heart, and inability to lie on his right side. Twelve months before I saw him his symptoms increased so much that he had to give up work and lead the life of an invalid. When I first saw him he suffered from marked dyspnœa, his pulse was very irregular and rapid, and of very small volume, the irregularities being due to frequent premature auricular contraction (Fig. 77).

The heart was dilated, the area of absolute cardiac

dulness extending from the left nipple line to 1 inch to the right of the middle line, and measuring 5 inches across at the nipple level (Fig. 70, *LL*); the apex-beat was feebly felt in the nipple line; there was no cardiac murmur, and his blood-pressure was 80-160 mm. Hg. A month before I saw the patient he had had influenza, and this had exacerbated all his symptoms. He had been treated with rest and cardiac tonics for some time, so I advised a course of "Nauheim"

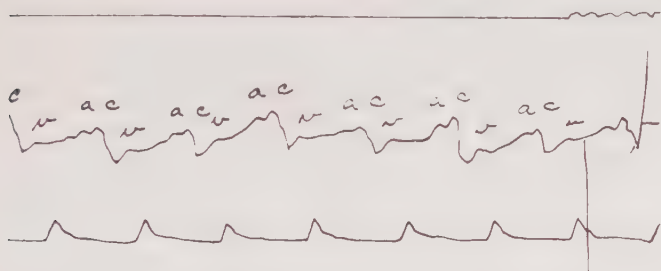


FIG. 78.—POLYGRAPHIC TRACING OF CASE XXII., AFTER TREATMENT, SHOWING A PULSE REGULAR IN TIME AND OF BETTER VOLUME.

baths and took him into a home for this purpose. The character of his pulse and his general condition soon began to improve, and at the end of a course of twenty-four baths, extending over a period of five weeks, his pulse was quite regular in time and better in volume (Fig. 78), and his blood-pressure had fallen to 80-130 mm. Hg.

Seven months after treatment he developed acute appendicitis with abscess, which necessitated an immediate operation; he stood the operation well

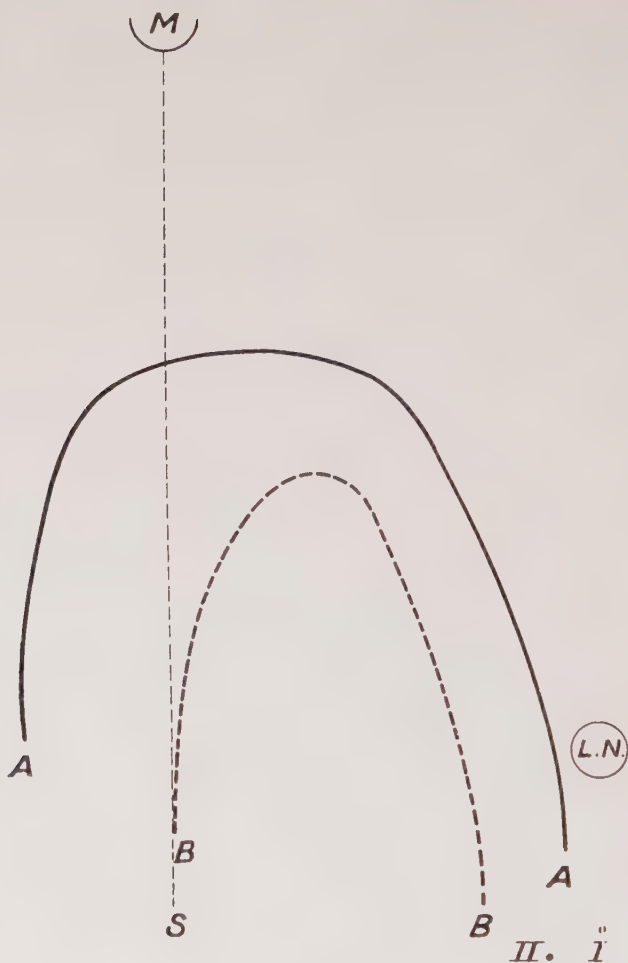


FIG. 79 —CASE XXII.

AA, area of cardiac dulness before treatment; *I*, apex-beat;
BB, area of cardiac dulness after treatment; *II*, apex-beat;
MS, mid-sternum; *LN*, left nipple.

and made a good recovery. He had been doing munition work for some months before this. A year after treatment he was perfectly well; could walk several miles in comfort; his pulse was absolutely regular and of good volume (Fig. 80), the area of cardiac dulness was normal (Fig. 79, *BB*), and his weight had dropped to 12 stone 10 pounds, nearly 2 stone less than before treatment.

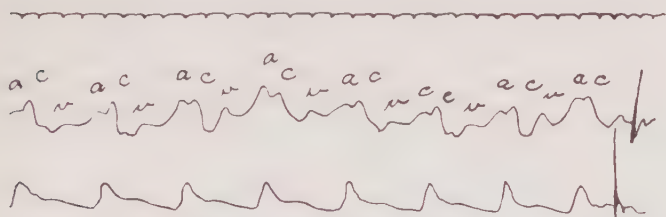


FIG. 80.—POLYGRAPHIC TRACING OF CASE XXII., A YEAR AFTER TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME; RATE 78 PER MINUTE.

He kept perfectly well for seven years after treatment, during this time he had been working hard at massage, the work being heavy and the hours long and irregular. He then began to feel his heart, and his pulse became irregular at times. His heart was somewhat dilated again and exhibited premature auricular contractions, so he took a four weeks' course of baths a short time ago. Considering the serious condition he was in before his first treatment, the very heavy work he had been doing continuously for seven years, and the operation for acute appendicitis he had gone through, it is not surprising that his heart gave way again after this long period.

CHAPTER VII

AURICULAR FIBRILLATION AND ALTERNATION

THE two most serious forms of cardiac irregularity are undoubtedly auricular fibrillation and alternation, if we except ventricular fibrillation, which latter is not compatible with continued existence except in rare cases for a very short period.³⁰

AURICULAR FIBRILLATION.

Cases of auricular fibrillation very rarely live for more than ten years after this symptom manifests itself, and usually for a much shorter period. Thomas Lewis says³¹ "that it is evidence of serious muscular damage to the heart and that few patients survive its onset for more than ten years." Price³² is of opinion, "that in the majority of cases heart failure results." All authorities agree that it is a very serious sign and is evidence of grave damage to the muscular walls of the heart.

In the majority of cases that exhibit this sign, the administration of large doses of digitalis will effect

³⁰ *Heart*. February 8, 1912. A. Hoffman.

³¹ "Clinical Disorders of the Heart Beat." Thomas Lewis.

³² "Diseases of the Heart." Price, p. 110.

great benefit, by producing high grades of partial heart block and lowering the rapidity of the ventricular beats, but in doing this they do not get rid of the cardiac dilatation which is always present in a greater or less degree. I have examined many cases which have been taking large doses of digitalis for very long periods, and in all of these I have found some degree of cardiac dilatation, usually a great deal. C. D. Brachmann,³³ in the analysis of 117 cases of auricular fibrillation, found that the most common symptom, next to irregular rhythm, was an enlarged heart, particularly auricular enlargement; he ascertained this both by X rays and percussion. He found that the two methods of examination gave similar results, and that there was only one heart in the 117 which approximated to the normal size. Personally I do not use X rays now to ascertain the size of a heart, except in unusual cases such as those where the presence of an aneurysm is suspected, because I have found that the results obtained by X rays coincided with those of percussion. There are quite a fair proportion of cases of auricular fibrillation which do not improve under the administration of digitalis (Case XXIII.), and regarding this group of cases Lewis³⁴ says: "In so far as the fibrillation and excessive heart-rate are concerned, nothing further can be done for them."

³³ "Auricular Fibrillation." C. D. Brachmann, *Lancet*, February 19, 1921.

³⁴ "Clinical Disorders of the Heart Beat." Thomas Lewis.

Recently, quinidine has been given in cases of auricular fibrillation, and in some it has stopped the fibrillation for a time, and produced a perfectly regular pulse. Its administration is, however, by no means devoid of danger, as it has caused sudden death on several occasions, from cardiac embolism. Ellis and Clark-Kennedy³⁵ writing on this subject say: "We would point out from the first that the use of quinidine is not without danger, the risk of embolism being a real one." John Hay³⁶ had one sudden death in fifteen cases he treated with quinidine, and C. C. Wolferth says:³⁷ "In a number of cases there have been untoward results." Several other cardiologists who have tried the treatment have pointed out its danger. Under these circumstances, if it is given at all, it should only be as a last resource, in cases which have failed to answer to any other form of treatment and are manifestly going from bad to worse; and the risk should always be explained to the patients, and their consent to its administration obtained.

From the above it will be seen that the two drugs which are of use in cases of auricular fibrillation are, large doses of digitalis, and quinidine. Digitalis does not always give relief and, as far as my experience goes, never cures the cardiac dilatation; whilst

³⁵ "Arrest of Auricular Fibrillation by Quinidine." Ellis and Clark-Kennedy. *Lancet*, October 29, 1921.

³⁶ John Hay. *British Medical Journal*, April 28, 1922.

³⁷ *American Journal of Medical Science*, vol. 162. C. C. Wolferth.

quinidine, though very satisfactory in some cases, is decidedly dangerous.

The "Nauheim" treatment will undoubtedly cure the dilatation for a long period, and will give more relief to the patient than any other form of treatment; besides, it is an absolutely safe treatment to administer to a case of auricular fibrillation, if given by a physician experienced in its use. In this class of case it is, however, very important that the baths should be supervised by a medical man who has had a material experience of their action, because very slight differences in either the strength, length, or temperature of the bath, cause a marked alteration in the results produced upon the circulation, and knowledge of these effects is essential when dealing with such cases, if the greatest good is to be obtained by the patient.

The extent of the dilatation and the rapidity of the irregular ventricular contractions, are the two signs which indicate the severity of a case, and if the dilatation can be got rid of and the ventricular rate reduced, the patient is put into a much more favourable position, both as to length of life and general good health.

In discussing auricular fibrillation Frederick A. Willius says:³⁸ "When the ventricular rate is rapid, many of the contractions are often ineffectual, that is, incapable of opening the aortic cusps, so that certain beats fail to reach the peripheral arteries.

³⁸ "Clinical Electrocardiography." F. A. Willius.

This results in a different count between the apical pulse-rate and the radial pulse-rate, and is termed the 'pulse-deficit.' When the ventricular rate drops, as the heart improves under rest and treatment, the pulse-deficit disappears, and often proves to be a valuable index in the management of the patient." Price is of the opinion,³⁹ "that persistent rate of 120 or over is a sign of serious omen."

In the following cases it will be seen that during the treatment the pulse-deficit generally disappeared, the ventricular rate was much decreased, and the dilatation was cured. No such results could be obtained by rest and administration of drugs alone, as is proved by the previous history of the cases which shows that such treatments had been used, either separately or combined, with unsatisfactory results.

CASE XXIII.—A man, aged sixty-one years, who had had a very irregular pulse for some years, but had not experienced any troublesome symptoms till a year before I saw him, when he had his prostate removed, and two months later an attack of pneumonia. Since that time he had had much palpitation, marked dyspnœa, and slept badly, he also had slight vertigo. As his condition did not improve though he was taking digitalin regularly, he was sent abroad for a rest and change, but as this did not mitigate his symptoms, he consulted me when he returned home.

He had very marked dyspnœa, even when sitting

³⁹ "Diseases of the Heart." Price.

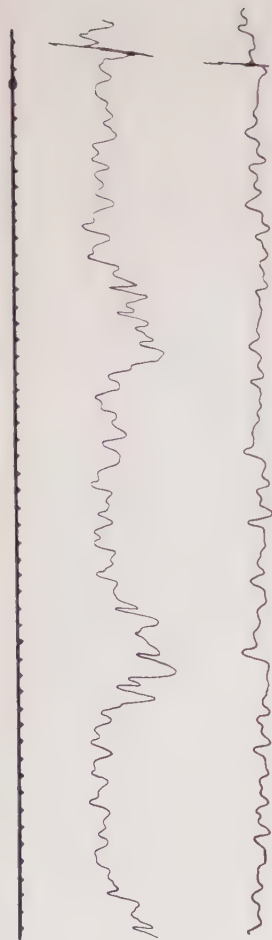


FIG. 81.—POLYGRAM OF CASE XXIII., BEFORE TREATMENT, SHOWING TYPICAL PULSE VERY IRREGULAR BOTH IN TIME AND VOLUME. THE UPPER TRACING WHEN ANALYZED SHOWS NO "a" PEAKS. RATE, 140 AT THE APEX, 120 AT THE WRIST; PULSE-DEFICIT 20.



FIG. 82.—POLYGRAM OF CASE XXIII., AFTER TREATMENT, SHOWING PULSE OF GREATLY IMPROVED VOLUME, MUCH SLOWER RATE AND LESSENED IRREGULARITY. THE "a" PEAKS ARE STILL ABSENT, SHOWING THAT AURICULAR FIBRILLATION IS STILL PRESENT. RATE, 64 AT THE APEX, 64 AT THE WRIST; PULSE-DEFICIT 0.

in a chair, his lips were cyanosed. His pulse was very irregular, 140 at the apex-beat, and 120 at the wrist, and was typical of auricular fibrillation (Fig. 81).

The impulse was very forcible and diffuse, and the apex-beat was just outside the nipple line. No murmur was heard. The area of cardiac dulness was

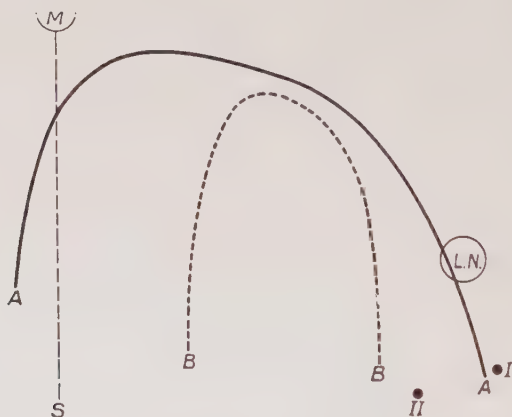


FIG. 83.—CASE XXIII.

AA, area of cardiac dulness before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *MS*, mid-sternal line; *LN*, left nipple.

much enlarged, extending from the left nipple line, to the right border of the sternum, and measuring just over 5 inches across at the nipple level. This indicated marked auricular dilatation (Fig. 83, *AA*, *I*). His blood-pressure was 120-140 mm. Hg.

When he started his course of baths I put him on to two tablets of anasarcin three times a day, for the first

ten days, and then one three times a day for another week. After this he took no cardiac tonics. He began to improve from the first, slept well and did not feel the palpitation so often or so markedly. His pulse was also much slower.

At the end of the five weeks' course, the dyspnœa and palpitation were very much less marked, and the pulse was much slower and stronger, 64 per

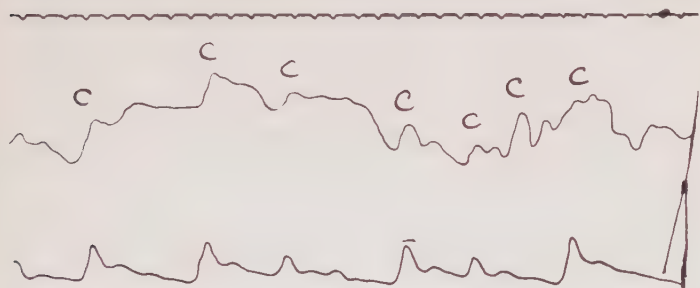


FIG. 84.—POLYGRAM OF CASE XXIII., FIVE MONTHS AFTER TREATMENT, SHOWING PULSE OF MUCH IMPROVED VOLUME; RATE, 76 AT APEX, 72 AT WRIST; PULSE-DEFICIT 4.

minute, and much less irregular. The pulse-deficit had disappeared (Fig. 82). The impulse was very much less diffuse and forcible, the apex-beat was nearly 1 inch inside the nipple line, and the area of cardiac dulness was normal, measuring $2\frac{1}{2}$ inches across at the nipple level, compared with 5 inches before treatment (Fig. 83, *BB*, *II*). His blood-pressure was 100-150 mm. Hg. Five months after he had finished treatment his condition was about the same, he did not feel any dyspnœa, his area of cardiac dulness was normal, and his pulse was of better

volume, 76 over the apex and 72 at the wrist, but was still typical of auricular fibrillation, no "a" peaks being present in the polygram (Fig. 84). He often did a whole day's shooting and said it did not overtire him.

CASE XXIV.—A young woman, aged thirty-two years, who had had rheumatic fever three times, chorea once, and scarlet fever. For some years she

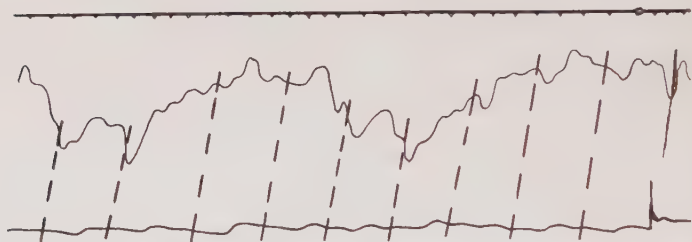


FIG. 85.—POLYGRAM OF CASE XXIV., BEFORE TREATMENT, SHOWING TYPICAL PULSE OF AURICULAR FIBRILLATION. THE DOTTED LINES INDICATE, IN THE JUGULAR TRACING, THE POINTS WHERE THE "a" PEAKS SHOULD START. IT WILL BE NOTED THEY ARE ABSENT.

had suffered from dyspnœa, palpitation, headache, vertigo, and pain over the region of the heart, and across the chest. She looked ill, her lips were very cyanosed, her dyspnœa was marked. Her pulse was 100 per minute, small and very irregular, a typical pulse of auricular fibrillation (Fig. 85). Her blood-pressure was 95-140 mm. Hg.

The cardiac impulse could be seen and felt all over the left side of the chest, and the diffuse, forcible apex-beat was $1\frac{1}{2}$ inches outside the left nipple line (Fig. 86, I). A loud systolic murmur was heard all

over the cardiac area and was loudest at the apex, a loud diastolic murmur was heard over the aortic area. Mitral and aortic regurgitation were evidently present. The area of cardiac dulness was much enlarged, especially towards the right side, indicating

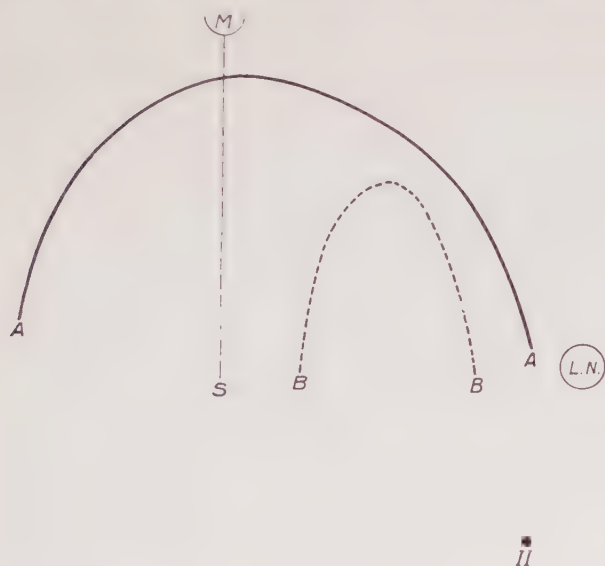


FIG. 86.—CASE XXIV.

AA, area of cardiac dulness before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternal line.

auricular dilatation; it extended from 1 inch inside the left nipple line, to $2\frac{1}{2}$ inches to the right of the middle line, and measured $5\frac{1}{2}$ inches across at the nipple level (Fig. 86, *AA*).

As the patient had been under medical care for a

long time and apparently could get no further benefit from treatment by drugs and rest alone, she came into a nursing-home in London, and started a course of "Nauheim" baths, at the same time continuing to take digitalis.

She began to improve from the first. At the end of the four weeks' course, she had lost the cyanosis, dyspnœa, pain, and vertigo, and said she felt better than she had done for years. Her pulse was 60 to

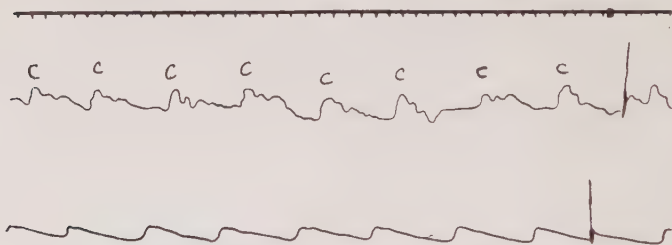


FIG. 87.—POLYGRAM OF CASE XXIV., AFTER TREATMENT, SHOWING AN ALMOST REGULAR PULSE OF BETTER VOLUME, RATE 60 PER MINUTE.

the minute, of much better volume, and practically regular, except for sinus arrhythmia, but the "a" wave was still absent (Fig. 87).

The cardiac impulse was almost normal and the apex-beat was $\frac{1}{2}$ inch inside the left nipple line (Fig. 86, II). The area of cardiac dulness was normal and measured $2\frac{1}{4}$ inches across at the nipple level, as compared with $5\frac{1}{2}$ inches before treatment (Fig. 86 BB). The murmurs were much softer and less diffuse.

She returned home, and six weeks later, Dr. L.

Barker of Much Hadham, her medical attendant, wrote: "I must say you have made a wonderful change in this patient; she is very much more improved than I thought at all likely."

At the present time, ten months after treatment, she writes to say that she feels ever so much better and stronger and can walk and get about much better than she used to.

Considering the severity of this case, and the double valvular complication, the patient did wonderfully.

ALTERNATION.

Alternation is regarded as the most serious form of cardiac irregularity, from the point of view of prognosis. Lewis says:⁴⁰ "It is the faint cry of an anguished and fast failing muscle, which, when it comes, all should strain to hear, for it is not long repeated. A few months, a few years at most, and the end comes." Mackenzie⁴¹ regards it as of grave import.

It is my experience that cases of alternation, as well as cases of auricular fibrillation, are always accompanied with cardiac dilatation, and that if that dilatation can be got rid of, the prognosis is greatly improved, the expectation of life much lengthened, and, in some cases (Case XXV.), the grave irregularity clears up and does not appear again.

Cardiac dilatation undoubtedly has a large share

⁴⁰ "Clinical Disorders of the Heart." Thomas Lewis.

⁴¹ "Diseases of the Heart." James Mackenzie.

in increasing the gravity of these signs; and it is undoubtedly a great achievement when one can get the cardiac muscle into a healthy state, by improving its tone and contractile powers, so that this cardiac dilatation is abolished. This can be done, in the majority of cases, by a course of "Nauheim" baths, and provided the cardiac muscle has not advanced too far upon the road to degeneration, dangerous symptoms can be relieved, and life materially lengthened.

The two following examples are illustrative of the good effects of a course of baths in cases where alternation had developed, accompanied by cardiac dilatation.

CASE XXV.—A young man, aged thirty-two years, had an attack of rheumatic fever fifteen years ago. The mitral valve was affected, and he developed double mitral disease, and marked cardiac dilatation (Fig. 88, *AA*). He was in bed for nearly a year and a half, only getting up once in this period, and on this occasion he fainted. At the end of the eighteen months of bed he consulted me and underwent a course of "Nauheim" baths. He got rapidly better so that within six months of the treatment he was leading a normal life. He went on perfectly well, seeing me at intervals, for about ten years, the latter three of which he had spent in "home" service in the army. His army service was too much for his heart, and he broke down again ten years after his first treatment. His heart was markedly dilated, the area of cardiac dulness extending from $\frac{1}{2}$ inch

inside the left nipple, to $1\frac{1}{2}$ inches to the right of the mid-sternal line, and measuring $4\frac{1}{2}$ inches across at the nipple level (Fig. 88, *BB*). The apex-beat was in the nipple line, the impulse was forcible and diffuse, and a loud double murmur was heard over this area, the systolic murmur being heard all over the cardiac area, and in the axilla. He constantly suffered from

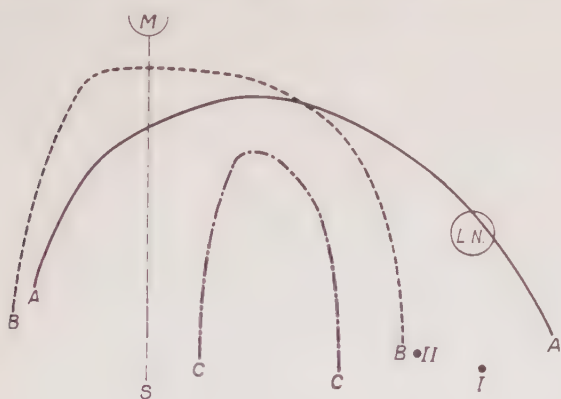


FIG. 88.—CASE XXV.

AA, area of cardiac dulness before first course; *BB*, area of cardiac dulness before second course; *I*, apex-beat; *CC*, area of dulness after second course; *II*, apex-beat; *LN*, left nipple; *MS*, mid-sternal line.

lengthy attacks of palpitation, during which his pulse ran up to 180 per minute, and *very marked alternation was present* (Fig. 89). His blood-pressure was 80-125 mm. Hg., and the urine was normal.

He underwent a second course of baths. The attacks of palpitation gradually diminished in length and frequency, and by the time he had finished the

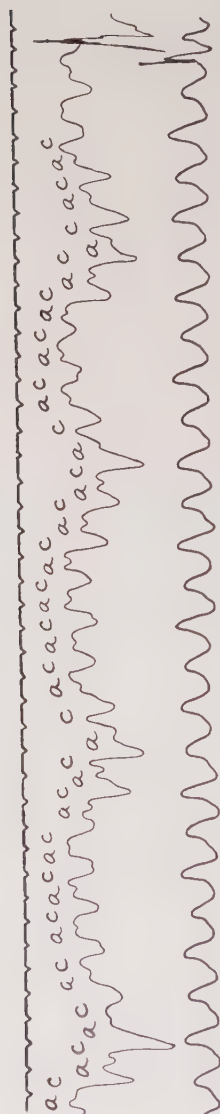


FIG. 89.—POLYGRAM OF CASE XXV. BEFORE TREATMENT, SHOWING PULSE OF 180 PER MINUTE WITH MARKED ALTERNATION, THE ALTERNATING SMALLER BEATS BEING VERY CLEARLY DEFINED.

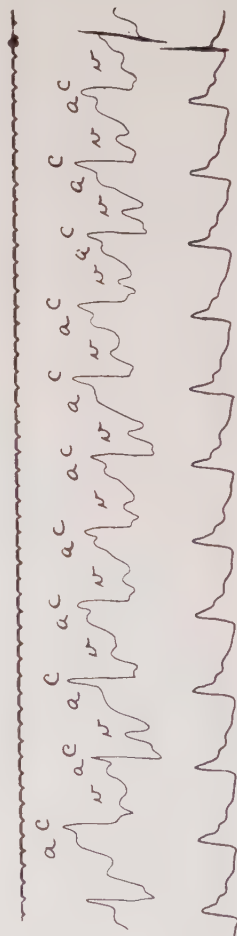


FIG. 90.—POLYGRAM OF CASE XXV. AFTER TREATMENT, SHOWING PULSE OF 65 PER MINUTE, OF GOOD VOLUME, AND REGULAR IN VOLUME AND TIME.

course he did not suffer from them at all. His cardiac dulness was normal (Fig. 88, *CC*), and the apex-beat was a good inch inside the nipple line (Fig. 88, *II*). His pulse was regular in time and volume, of good volume, 65 per minute, and showed no alternation (Fig. 90). I have seen him several times within the last five years. His pulse was always regular in

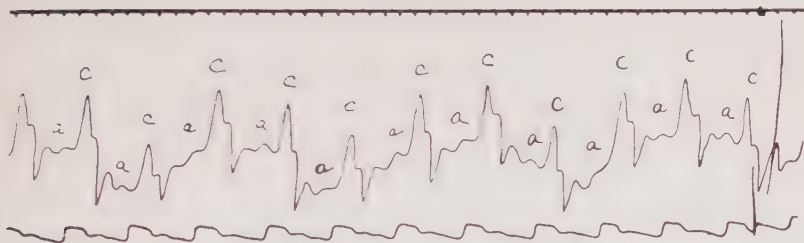


FIG. 91.—POLYGRAM OF CASE XXV., TWO AND A HALF YEARS AFTER SECOND COURSE, SHOWING REGULAR PULSE WITH NO EVIDENCE OF ALTERNATION. RATE, 66 PER MINUTE.

time and volume, no alternation ever showing, and he is keeping in fair health. Fig. 91 is a polygram taken two and a half years after his second course.

At the present time, just before going to press, five years and four months after his second course, he has developed palpitation and cardiac dilatation again, and is now undergoing a third course of baths. There has been no sign of alternation, and there is every likelihood that he will live in fair health for many years, as he is already greatly improved after two weeks' treatment. Had he not had a course of baths five and a half years ago when he developed

alternation, I am convinced he would not have lived long. He is now forty-seven years of age.

CASE XXVI.—A man, aged sixty-six years, who had worked hard all his life and had had many attacks of influenza. For about one year before I saw him he had felt less and less able to undergo exertion of any sort, had had marked oppression on the chest, constant attacks of vertigo, and palpitation. He was markedly cyanosed and suffered from dyspnœa. His vessels did not feel definitely thickened, his blood-pressure was 100-165 mm. Hg. His pulse was very irregular, and a polygram showed constant premature auricular contractions ($a'c'v'$). The long pause after the premature contraction ($a'c'v'$, Fig. 92) is followed by a large beat, this in turn is followed by a small beat (* Fig. 92), and the succeeding beat († Fig. 92) is larger. The small beat (* Fig. 92) is evidence that the contractility of the heart is greatly exhausted, and is an example of alternation following premature contraction. James Mackenzie has an example of this in his book on "Diseases of the Heart,"⁴² and points out that it implies grave exhaustion of the contractile power of the left ventricle. If this polygram is compared with Fig. 94, a polygram taken at the end of the baths, it will be seen that, although premature contractions are still present, there is no alternation, the " *" beats being quite as strong as the "†" ones. This result is conclusive evidence of the beneficial effect a course

⁴² "Diseases of the Heart," p. 189. James Mackenzie.

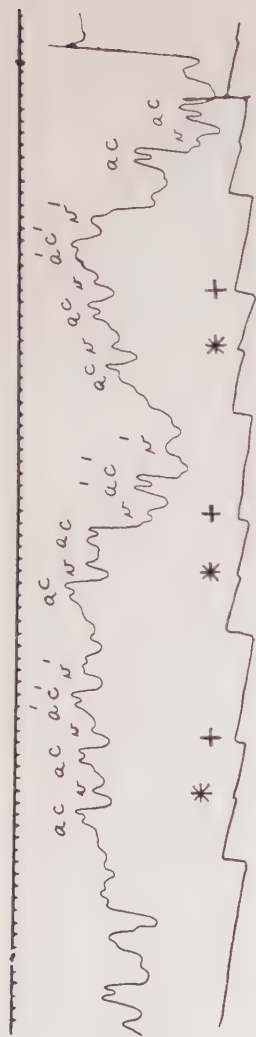


FIG. 92.—POLYGRAM OF CASE XXVI. BEFORE TREATMENT, SHOWING CONSTANT PREMATURE ATRICULAR CONTRACTIONS ($a'c'v'$) AND ALTERNATION, THE SMALLER SIZED BEATS BEING INDICATED BY A *, AND THE LARGER BY A †.

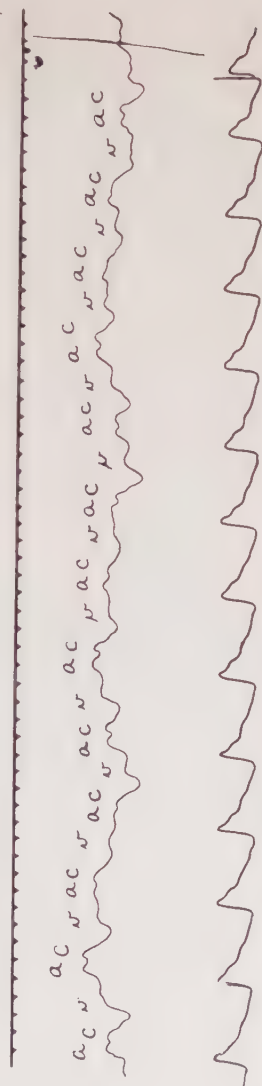


FIG. 93.—POLYGRAM OF CASE XXVI., TAKEN A QUARTER OF AN HOUR AFTER POLYGRAM 92, AFTER A SIX MINUTES' BATH HAD INTERVENED. IN THIS POLYGRAM THERE IS NO IRREGULARITY, EITHER OF TIME OR VOLUME, ILLUSTRATING THE MARKED IMPROVEMENT IN THE TONE AND CONTRACTILITY OF THE CARDIAC MUSCLE PRODUCED BY THE BATH.

of "Nauheim" baths has upon the tone and contractile power of the cardiac muscles.

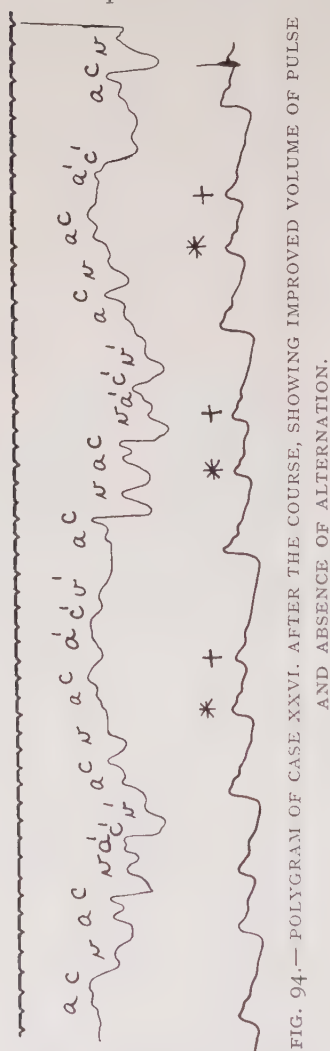


FIG. 94.—POLYGRAM OF CASE XXVI. AFTER THE COURSE, SHOWING IMPROVED VOLUME OF PULSE AND ABSENCE OF ALTERNATION.

The two polygrams (Fig. 92 and Fig. 93) were taken respectively, before and after, a six minutes' bath. It will be seen that before the bath, the pulse was very irregular in time, due to premature auricular contractions, and also in volume, due to alternation (Fig. 92). After the bath it was of good volume and regular, both in time and volume (Fig. 93).

The area of cardiac dulness was decidedly increased, extending from the left nipple, to the right border of the sternum and measuring $4\frac{3}{4}$ inches across at the nipple level (Fig. 95, *AA*), the apex-beat was in the nipple line (Fig. 95, *I*). A soft systolic murmur was heard over the aortic area.

At the end of the course the patient was much

better, he had no vertigo, very slight palpitation, and no tightness of the chest, and the cyanosis was much less marked. The area of cardiac dulness was normal, extending from 1 inch inside the left nipple, to 1 inch to the left of the mid-sternal line, and measuring $2\frac{1}{4}$ inches across at the nipple level, the apex-beat was 1 inch inside the left nipple (Fig. 95, *BB*, *I*).

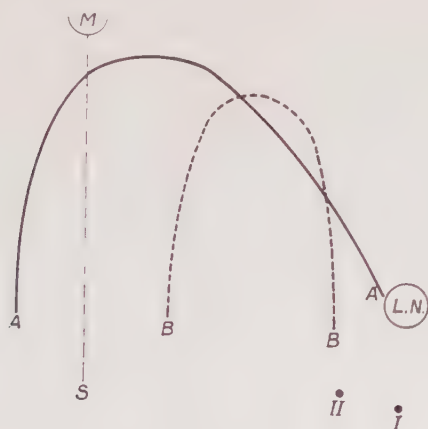


FIG. 95.—CASE XXVI.

AA, area of cardiac dulness of Case XXVI. before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternal line.

Six months after treatment the patient was still improving and there was no evidence of alternation, and the blood-pressure was 90-145 mm. Hg.

The regularity in time was not maintained permanently, yet it was much more constant than it had

been before treatment. One would not expect to entirely abolish premature beats in a patient of this age, though in younger cases exhibiting pulses which are irregular in time, before treatment, one often gets a permanent return to regularity, as a result of a course of baths.

CHAPTER VIII
IRRITABLE HEART. GRAVES'
DISEASE

IRRITABLE HEART.

PATIENTS with irritable rapid cardiac action, who are prone to palpitation and attacks of tachycardia, although they have little or no cardiac dilatation, are some of the most difficult to deal with. Drugs and rest have no lasting benefit, for directly they begin to resume their ordinary life after a rest-cure, the old symptoms return. These cases are often a sequela of influenza or some other form of febrile attack, occurring in a neurasthenic and highly strung patient, and they exhibit a constantly over-rapid pulse, which is greatly accelerated by any slight exertion or excitement, and a forcible cardiac action which, not infrequently, keeps the patient awake at night by its violence and rapidity. This condition is often complicated by some defect in the nodes or bundles, causing constant cardiac irregularities, generally due to ventricular, or auricular premature contractions. In cases of this temperament these irregularities are apt to be dwelt upon, and to cause so much anxiety and physical discomfort that the patient's life is rendered miserable.

It is often stated by those who have no practical knowledge of the "Nauheim" treatment, that these cases of nervous, irritable hearts, are *the* ones who derive most benefit from a course of baths. As a matter of fact, they are the most uncertain cases, as regards the effect that will be produced upon them; some are no doubt markedly benefited, and the action of the heart is quieted down and becomes regular in time, if it was irregular before treatment; whilst others, especially those exhibiting some cardiac hypertrophy but no dilatation, do not seem to get any great benefit.

In nearly all other forms of cardiac disease, if they have not been left till the last stages of cardiac failure, one can give a promise of improvement, and generally great improvement, in health; but in these nervous cases it is well to be guarded as to giving a prognosis of great improvement, for they are, in many cases, the result of an unstable highly strung nervous system, and not of cardiac trouble in the first place, and require a much longer period to be restored to health than a case of cardiac dilatation, with or without valvular disease, in a patient with an average nervous system. Case XXVII. is a typical one of the kind, and one in which a markedly good result was obtained by a course of baths.

CASE XXVII.—The patient, a woman, aged forty-two, suffered from palpitation, dyspnœa, fainting attacks, dyspepsia, and a constantly intermittent cardiac action, which caused great distress and kept

her awake at night, so that she rarely had more than a few hours' sleep. She had had influenza several times, but no other definite illness. She was a pale, fragile-looking woman. Her cardiac dulness was

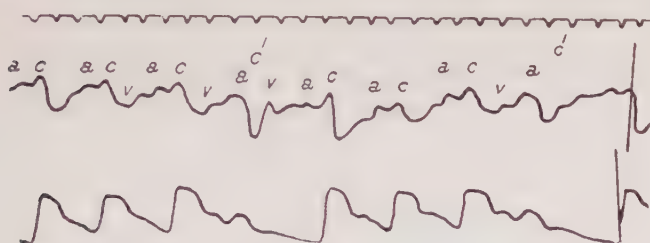


FIG. 96.—POLYGRAPHIC TRACING OF CASE XXVII., BEFORE TREATMENT, SHOWING CONSTANT PREMATURE VENTRICULAR CONTRACTIONS (*c'*) FALLING WITH THE REGULAR AURICULAR CONTRACTIONS (*a*); PULSE-RATE 93 PER MINUTE.

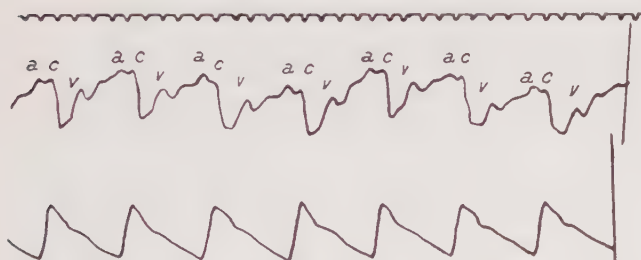


FIG. 97.—POLYGRAPHIC TRACING OF CASE XXVII., AFTER SIX BATHS, SHOWING REGULARITY OF RADIAL AND VENOUS TRACINGS, INDICATING IMPROVED CARDIAC CONDUCTIVITY; PULSE-RATE 62, REGULAR.

somewhat enlarged, extending from the left nipple line, to the right border of the sternum; the impulse was forcible and diffuse, especially after premature ventricular contractions, which were very frequent (Fig. 96). The heart sounds were clear, the pulse

was 92 per minute, and very intermittent, the urine was normal, and the blood-pressure was 90-140 mm. Hg. A polygraphic tracing showed that constant premature ventricular contractions, marked *c'* (Fig. 96), were the cause of the cardiac irregularity. As this patient had had a lengthy treatment by rest and various cardiac tonics, without any material benefit, I at once started her with "Nau-

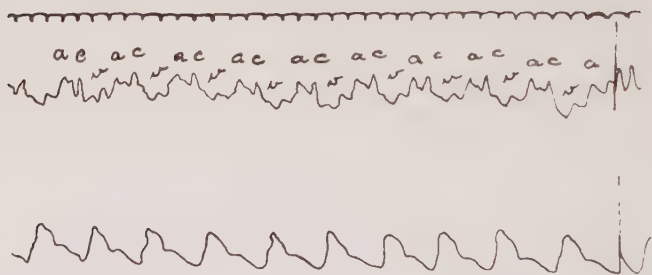


FIG. 98.—POLYGRAPHIC TRACING OF CASE XXVII., NINE MONTHS AFTER TREATMENT, SHOWING PERFECTLY REGULAR PULSE; RATE 88 PER MINUTE.

heim" baths and resistance-exercises. After she had taken six baths she was sleeping much better, had no indigestion, the palpitation was rarely noticed, and the premature ventricular contractions were very much less frequent, and were scarcely felt by the patient. The marked improvement in the cardiac conductivity is well shown by comparing Figs. 96 and 97, the former having been taken before treatment, and the latter after six baths had been taken.

Nine months later the patient was still in better health and sleeping much better, and said her pulse

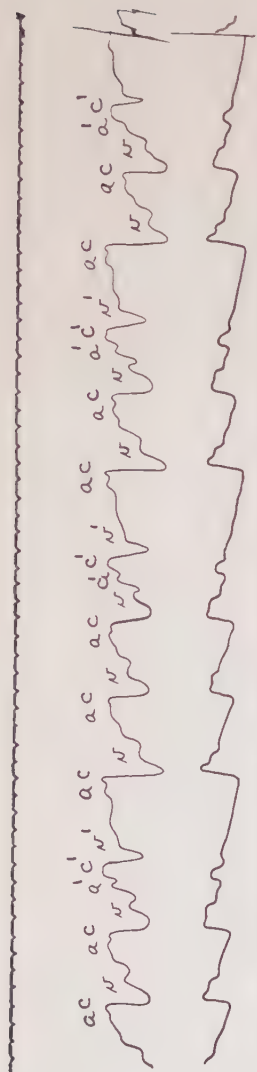


FIG. 99.—POLYGRAM OF CASE XXVII., BEFORE SECOND COURSE, SHOWING SEVERAL AURICULAR PREMATURE CONTRACTIONS ($a'c'v'$).

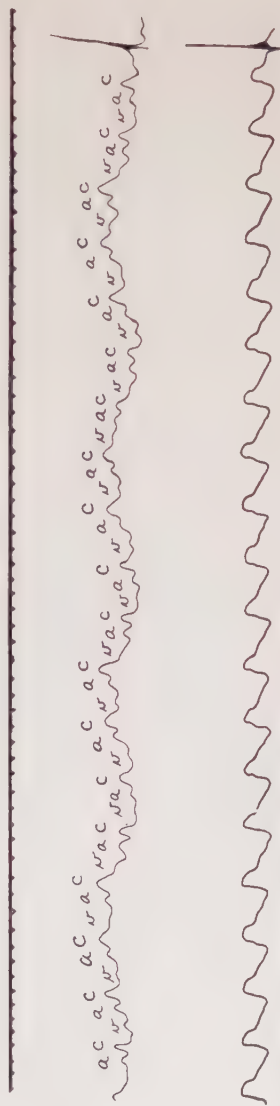


FIG. 100.—POLYGRAM OF CASE XXVII., TWO AND A HALF YEARS AFTER SECOND COURSE, SHOWING REGULAR PULSE OF GOOD VOLUME, 78 PER MINUTE.

was rarely irregular; a polygraphic tracing (Fig. 98) showed it perfectly regular at the time of examination.

For six years after treatment the patient kept in good health, and was not troubled with cardiac irregularity, but after this period, and a severe attack of influenza, the heart began to give trouble again, and the irregularity returned, being now due to auricular premature contractions (Fig. 99, *a'c'v'*), and not to ventricular premature contractions as formerly (Fig. 96, *c'*).

She had another course of baths and the heart again became regular and gave no trouble. Two and a half years after this second course the pulse was still perfectly regular (Fig. 100), the patient was in good health, and the area of cardiac dulness was normal.

Just before going to press I heard from this patient that she can take long walks with comfort.

GRAVES' DISEASE.

In cases of Graves' disease, especially if cardiac dilatation is present, as it practically always is to a more or less degree, a course of baths will be of great benefit, quieting the heart and getting rid of the dilatation, and, at the same time, of many of the trying symptoms which are caused by the dilatation, such as insomnia, dyspnœa, and cardiac pain. It is only in *early* cases of the disease that the "Nauheim" baths, in conjunction with a course of X rays and

general treatment, will have a chance of producing a cure, and even in these cases a second course after a short interval, is often necessary, and no definite certainty as to cure by this treatment, can be given to any individual patient, as is also the case with any form of medical treatment for Graves' disease.

There is no doubt that the greatest use for the "Nauheim" treatment in this disease, is when it is given to advanced cases with serious cardiac dilatation, as a preliminary to fitting them to undergo an operation. I have given treatment to cases which were absolutely unfit to stand an operation, and would have undoubtedly succumbed from heart failure if they had been operated on, and these cases have improved so greatly, especially with regard to their cardiac condition, that some time after treatment, they have been able to undergo an operation for removal of part of the enlarged thyroid, and have gone through it with absolute safety and been restored to health.

The following two cases are examples of advanced Graves' disease, in which this course has been followed with excellent results.

CASE XXVIII.—A lady, aged sixty years, was sent to me by Dr. T. L. Drapes, of Chepstow. He informed me that she had had an operation for cysts of the thyroid, that the right lobe of the thyroid was enlarged, and that she had a dilated heart, and suffered from dyspnœa, rapid pulse, 130 per minute, and coarse tumours of the hands. She had had a

shock six months previously and had got worse since. He had kept her in bed for a month. When I first saw the patient she was very thin and anxious-looking, the right lobe of the thyroid was a good deal enlarged, the pulse was 120 per minute, regular, and of good volume, and there was nothing special to be noted in a polygraphic tracing, except a marked shortening of the *a-c* interval, a condition which I have often noted to exist in any very rapid cardiac contractions, whether they are dependent upon hyperthyroidism or not.

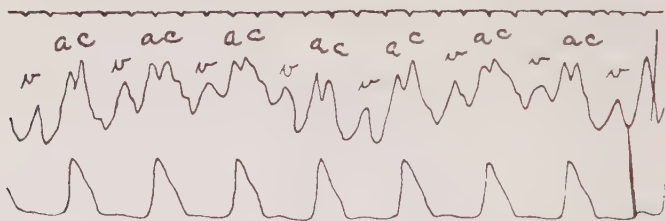


FIG. 101.—POLYGRAPHIC TRACING OF CASE XXVIII.; THE *a-c* INTERVAL IS MARKEDLY SHORTENED.

The blood-pressure was 70-180 mm. Hg., the heart sounds were clear, and the heart was markedly dilated, the area of absolute cardiac dulness extending from the left nipple line, to 1 inch to the right of the mid-sternal line, and measuring $5\frac{1}{4}$ inches across at the nipple level (Fig. 102, *AA*).

She complained of palpitation, great weakness, and insomnia, with inability to lie on her left side, increasing thinness, headache, and flatulence.

Considering her very dilated heart, and exceeding debility and weakness, she was quite unfit to stand

an operation, and would have undoubtedly succumbed if she had had one at that time.

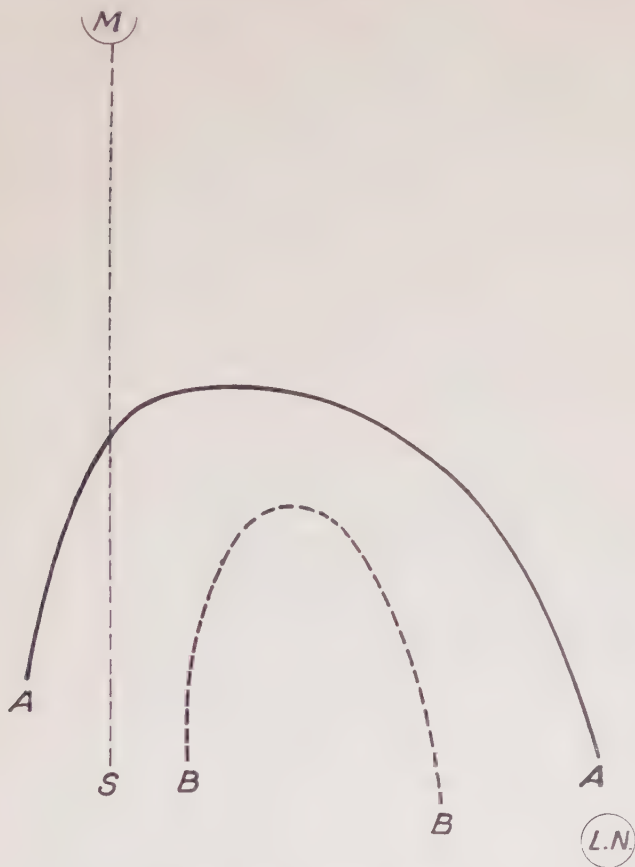


FIG. 102.—CASE XXVIII

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *LN*, left nipple; *MS*, mid-sternum.

She started her treatment with "Nauheim" baths, and after a period of three weeks, when she was

stronger and able to go out, I sent her to Dr. Florence Storey twice a week for X-ray treatment. By the end of the course she was sleeping much better, and could do so comfortably on her left side, she had put on 6 pounds in weight, had little flatulence, and felt altogether stronger. Her pulse varied from about 80 to 90 per minute, the cardiac dulness was normal (Fig. 102, *BB*), and the blood-pressure had fallen to 60-130 mm. Hg. The patient returned home and wrote to me a month later to tell me that, despite the fact that she had had a bad attack of influenza, she was still steadily improving in health.

A year after treatment she had gained 12 pounds in weight, the heart still showed no signs of dilatation, and she was able to do a good deal, but her pulse was increasing in frequency again, and the thyroid was enlarging. I advised her to have an operation, and this was performed by Mr. A. J. Walton.

She stood the operation splendidly, and steadily improved in health after it. Three years after her course of baths, and two years after the operation, her heart was still quite normal except for a somewhat rapid action, she was 16 pounds heavier than before the operation, and could lead a moderately normal life. At the present time she is sixty-four years of age, and there is no indication that she should not live to a good old age, though she would undoubtedly have died if she had not had the "Nauheim" treatment, or if she had been operated on before she had had it.

CASE XXIX. The patient, a young woman aged twenty-three years, had been a sufferer from steadily increasing illness for four years. Her mother and sister had had rheumatic fever. She suffered from insomnia, great nervousness, pains over the heart, palpitation, dyspnoea, and great debility. She was a very frail-looking girl, with prominent eyes and marked anæmia. The thyroid was decidedly enlarged, her pulse was 140 per minute, and small in

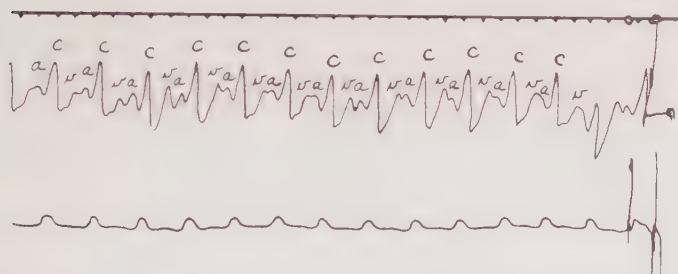


FIG. 103.—POLYGRAM OF CASE XXIX., BEFORE TREATMENT, SHOWING PULSE OF SMALL VOLUME, 125 PER MINUTE, WITH A SOMEWHAT SHORTENED *a-c* INTERVAL.

volume. The cardiac impulse was very forcible and was felt all over the left side of the chest. The area of cardiac dulness was greatly enlarged, extending from $\frac{1}{2}$ inch outside the left nipple, to an inch to the right of the middle line, and measuring $5\frac{1}{2}$ inches across at the nipple level. The apex-beat was nearly an inch outside the nipple line (Fig. 104, *AA, I*). A marked localized systolic murmur was heard over the apex. The *a-c* interval was slightly less than normal (Fig. 103). There was some œdema of the legs.

She had had several months' absolute rest in bed with various drug treatments, but was not in any way better. I gave her a course of "Nauheim" baths, and she started to improve in health from the first. After a five weeks' course the cardiac impulse

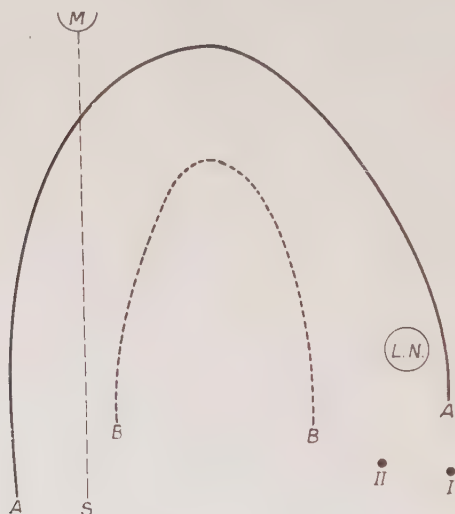


FIG. 104.—CASE XXIX.

AA, area of cardiac dulness before treatment; *I*, apex-beat before treatment; *BB*, area of cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternal line.

was much lessened, the area of cardiac dulness was normal, extending from 1 inch inside the nipple line, to $\frac{1}{2}$ inch to the left of the middle line, and measuring $2\frac{1}{2}$ inches across at the nipple level, the apex-beat was just inside the nipple line (Fig. 104, *BB*, *II*). There was no œdema of the legs.

Her insomnia, palpitation, pain, and dyspnoea were very much less, and her general health was greatly improved. Her pulse was still rapid and the thyroid and exophthalmia were not lessened. I advised her to rest for a few months, and if she was not greatly improved by then, to have part of the thyroid removed.

Eight months later the improvement was maintained, but was not more marked, so she had one lobe of the thyroid removed by Mr. A. J. Walton.

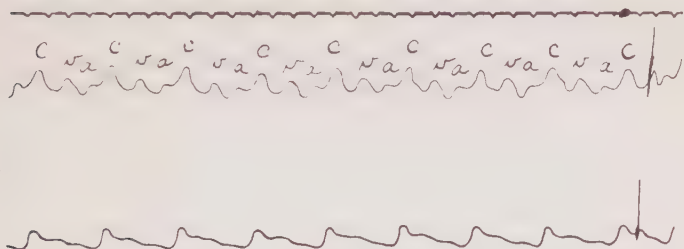


FIG. 105.—POLYGRAM OF CASE XXIX., TEN DAYS AFTER OPERATION, SHOWING PULSE OF MUCH IMPROVED VOLUME, 84 PER MINUTE, AND NORMAL *a-c* INTERVAL.

She stood the operation splendidly, and ten days after the operation her pulse-rate had dropped to 84 per minute (Fig. 105).

About two years after the operation she wrote to me that she felt very well and was sure the operation was a success, and that she did not feel her heart as she used to do.

I have given these two cases as examples of those who had "Nauheim" treatment in order to fit them for operation, because I am certain neither of them

would have survived an operation before treatment on account of the greatly dilated condition of their hearts; and also, because they varied as greatly as any cases of Graves' disease could, from each other, the one being a young girl, and the other a woman well past middle age.

If all advanced cases of Graves' disease who decided to undergo an operation, were to have a course of "Nauheim" baths to strengthen the heart and cure dilatation, previously to the operation, I firmly believe that the mortality from this procedure would be greatly lessened, and the ultimate results would be better.

CHAPTER IX

THE DESCRIPTION AND ADMINISTRATION OF THE EXERCISES

RESISTANCE-EXERCISES form a useful adjunct to the treatment, in a few cases, and there are some exceptional ones in which it is found that the baths, which have a much more powerful and rapid action than the exercises, cannot be tolerated at first; in these, a set, or part of a set, of exercises, given once a day for a fortnight or three weeks before the baths are commenced, is of very great value, and will enable some patients who could not otherwise have taken baths to do so. Cases of this kind, however, are rare in my experience (Case VI., Chapter III.). Mechanical exercises undertaken by the patient with the aid of a machine or apparatus, have sometimes been prescribed for cases of cardiac and circulatory disease, but it seems to me a self-evident fact that exercises, the force of which can be regulated by an experienced person who is taught to watch the pulse, respiration, and general condition of the patient, as a guide, and to modify or increase the resistance to suit each individual case, are very much superior to those which are regulated by the patient's own conception of what is best for him, or by a mechanical

contrivance, however perfect and ingenious that contrivance may be.

The resistance-exercises are administered by a nurse, male attendant, or by the medical man himself. They consist in a set of movements so planned as to exercise every muscle in the body consecutively, the force employed being a regulated resistance to the movements, on the part of the administrator; it is therefore very necessary that this administrator should be an experienced individual, trained to watch the pulse and to regulate the resistance used by the effect produced.

These regulated exercises cause dilatation of the muscular capillaries, thus reducing the arterial tension, and thereby relieving the heart; a fact that is demonstrated by the pulse of increased volume, lowered tension, and lessened or unaltered rapidity, which is obtained *when they are properly given*.

To give the exercises without watching the pulse, and only to modify them when the patient shows signs of distress, such as perspiration, rapid breathing, or cyanosis, is to defeat one's object, for by the time any of these signs manifest themselves, the arterial tension is probably higher and the pulse-rate more rapid than they were before the exercises.

The alterations produced upon the pulse when the exercises are properly given to a suitable case, are well shown in Figs. 106 and 107, the polygraphic tracings of Case VI., Chapter III., which I took before and after giving the exercises myself. The pulse is



FIG. 106.—POLYGRAPHIC TRACING OF CASE VI., CHAP. III., TAKEN BEFORE EXERCISES, SHOWING A PULSE OF 68 PER MINUTE OF VERY POOR VOLUME, AND EXHIBITING CONSTANT PREMATURE AURICULAR CONTRACTIONS ($a'c'$).

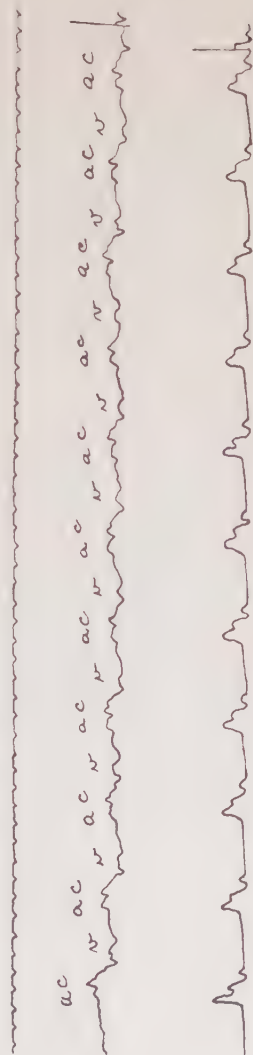


FIG. 107.—POLYGRAPHIC TRACING OF CASE VI., CHAP. III., TAKEN AFTER HALF AN HOUR'S RESISTANCE-EXERCISES, SHOWING A PULSE OF 60 PER MINUTE, OF MUCH IMPROVED VOLUME AND ABSOLUTE REGULARITY.

slowed in rate and much improved in volume, and the cardiac conductivity is also improved; a fact which is indicated by the absolute regularity of the pulse after exercises, as compared with the constant premature auricular contractions which were present before the exercises were given.

As a rule, the exercises are given only on the days when no bath is taken, and I believe this to be the wisest plan to pursue all through the course with most cases. It is sometimes advisable to give only a few exercises at first, and to gradually increase the number given until the patient is having all the exercises at each "sitting"; but this is entirely dependent upon the condition of the patient and the effect produced, and must be decided for each individual case. I make it a rule to give the exercises myself on the first occasion, having the nurse present to receive any special instructions.

The exercises should not be given till at least one hour after a meal; the patient, if a man, should have removed his coat, waistcoat, and braces; if a woman, she should have removed her corsets, and wear a dressing-jacket and a short light skirt. The patient should sit down for a few minutes between each exercise, and should lie down quietly for at least half an hour after they are concluded.

If the exercises tend to produce an increased pulse-rate, a raised arterial tension, or a decreased volume of the pulse, they should be given with less resistance and in fewer number. The administrator

should be careful to see that regular breathing is maintained all through the exercises, as patients are often inclined to hold their breath, unless they are instructed not to, and even then they may do so involuntarily.

The exercises should be given slowly and quite steadily, with a uniform resistance, and the avoidance of any jerky movements. The position of the administrator's hands is so planned that he can offer resistance to the patient's movements during the entirety of each exercise; I shall, therefore, not repeat in the description of each exercise the fact that the administrator is to give resistance, but shall take this to be understood.

DESCRIPTION OF THE EXERCISES.

[N.B.—In the plates illustrative of the exercises the administrator is the clean-shaven man.]

ARM EXERCISES.

Movement I.

The administrator and the patient stand in the respective positions shown in Fig. 108; the patient then opens his arms, against the resistance of the administrator, till they are in the position shown in Fig. 109. The administrator now changes the position of his hands to that shown in Fig. 109, and the patient then brings his arms back to the position shown in Fig. 108.



FIG. 108.



FIG. 109.

Movement II.

The administrator and the patient stand in the respective positions shown in Fig. 110; the patient



FIG. 110.

then raises his arms directly outwards and upwards to the position shown in Fig. 111. The administrator

now changes the position of his hands to that shown in Fig. 111, and the patient then brings his arms back to the position shown in Fig. 110.



FIG. 111.

Movement III.

The administrator and the patient stand in the respective positions shown in Fig. 112; the patient then raises his arms directly forwards and upwards



FIG. 112.

to the position shown in Fig. 113, the administrator letting his hands gradually slip round to the dorsal surface of the patient's wrists till his hands are in

the position shown in Fig. 113. The patient now brings his arms directly forwards and downwards, back to the position shown in Fig. 112, but when



FIG. 113.

they have reached the position shown in Fig. 114, the administrator lets the palms of his hands slip under the patient's wrists to their ulnar surfaces, and brings his thumbs against their dorsal surfaces; in

this position he can offer the required resistance during the completion of the movement. (The change of position of the administrator's hands, to



FIG. 114.

be carried out in the middle of this exercise, is illustrated in Fig. 114, and is executed without stopping the movement.)

Movement IV.

The administrator and the patient stand in the respective positions shown in Fig. 115; the patient



FIG. 115.

then flexes his forearm till it is in the position shown in Fig. 116. The administrator now changes the position of his hands to that shown in Fig. 116, and

the patient then extends his forearm back to the positions shown in Fig. 115. The same movement is then gone through with the other arm.



FIG. 116.

Movement V.

The administrator and the patient stand in the respective positions shown in Fig. 117; the patient



FIG. 117.

then raises his arms in their flexed position, keeping them as close as possible to the body and face, to the position shown in Fig. 118. The administrator

now changes the position of his hands to that shown in Fig. 118, and the patient then brings his arms back to the position shown in Fig. 117.



FIG. 118.

Movement VI.

The administrator and the patient stand in the respective positions shown in Fig. 119; the patient



FIG. 119.

then raises his arms directly backwards and upwards to the position shown in Fig. 120. The adminis-

trator now changes the position of his hands to that shown in Fig. 119, and the patient then brings his arms back to the position shown in Fig. 119.



FIG. 120.

LEG EXERCISES.

In all these exercises the patient steadies himself by placing his hand on the back of a chair as shown in the illustrations.



FIG. 121.

Movement I.

The administrator and the patient assume the respective positions shown in Fig. 121; the patient

then raises the leg, slowly flexing it at the hip, directly forwards and upwards to the position shown in Fig. 122. The administrator now places his other



FIG. 122.

hand in the position shown in Fig. 122, and the patient then brings his leg back to the position shown in Fig. 121. The same movement is then gone through with the other leg.

Movement II.

The administrator and the patient assume the respective positions shown in Fig. 123; the patient then raises the leg, slowly extending it at the hip,



FIG. 123.

directly backwards and upwards to the position shown in Fig. 124. The administrator now places his other hand in the position shown in Fig. 124, and the

patient then brings his leg back to the position shown in Fig. 123. The same movement is then gone through with the other leg.



FIG. 124.

Movement III.

The administrator and the patient assume the respective positions shown in Fig. 125; the patient



FIG. 125.

then slowly abducts the leg to the position shown in Fig. 126. The administrator now places his other hand in the position shown in Fig. 126, and the

patient then brings his leg back to the position shown in Fig. 125. The same movement is then gone through with the other leg.



FIG. 120.

Movement IV.

The administrator and the patient assume the respective positions shown in Fig. 127; the patient



FIG. 127.

then raises the leg, slowly flexing it at the knee and the hip, to the position shown in Fig. 128. The administrator now changes the position of his hand

to that shown in Fig. 128, and the patient then brings his leg back to the position shown in Fig. 127. The same movement is then gone through with the other leg.



FIG. 128.

Movement V.

The administrator and the patient assume the respective positions shown in Fig. 129; the patient



FIG. 129.

then brings his right foot forward, and across the front of the left foot, describing a small semicircle round the left foot, to the position shown in Fig. 130;

he then brings the right foot back, through the same semicircle, to the position shown in Fig. 129. The administrator resists the forward movements with



FIG. 130.

the right hand, and the backward movements with the left. The same movement is then gone through with the left leg.

THE BODY MOVEMENTS.

Movement I.

The administrator and the patient stand in the respective positions shown in Fig. 131; the patient



FIG. 131.

then slowly flexes his body at the hips, bending directly forwards and downwards, into the position shown in Fig. 132. The administrator now changes

the position of his hands to that shown in Fig. 132, and the patient then brings his body back to the position shown in Fig. 131.

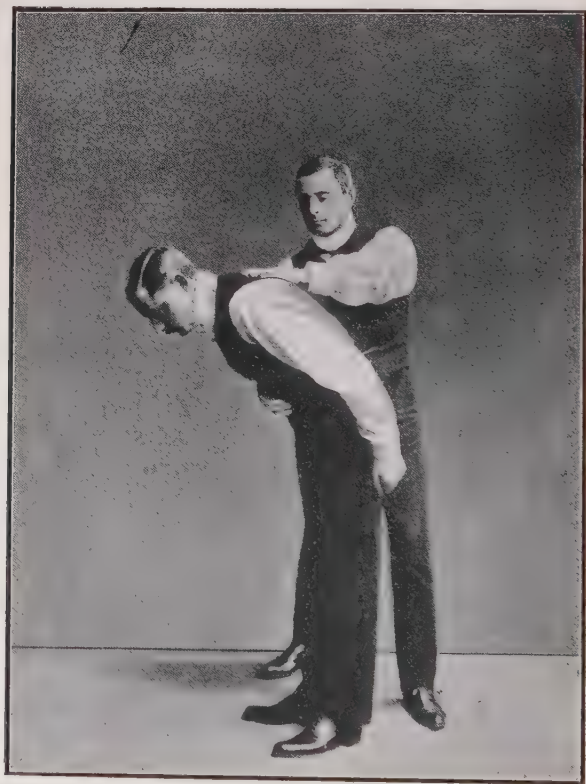


FIG. 132.

Movement II.

The administrator and the patient stand in the respective positions shown in Fig. 133; the patient



FIG. 133.

then flexes his body at the hips, bending directly sideways to the left, into the position shown in Fig. 134. The administrator now changes the position

of his hands to that shown in Fig. 134, the patient then brings his body back into the position shown in Fig. 133, and then flexes it directly sideways to



FIG. 134.

the right, as far as possible; the administrator now changes the position of his hands back to that shown in Fig. 133, and the patient then brings his body back to the original position, shown in Fig. 133.

The administrator gives resistance, first with the right hand, then with the left, and finally with the right again.

Movement III.

The administrator and the patient stand in the respective positions shown in Fig. 135; the patient then rotates his body, on his hips, bringing the left

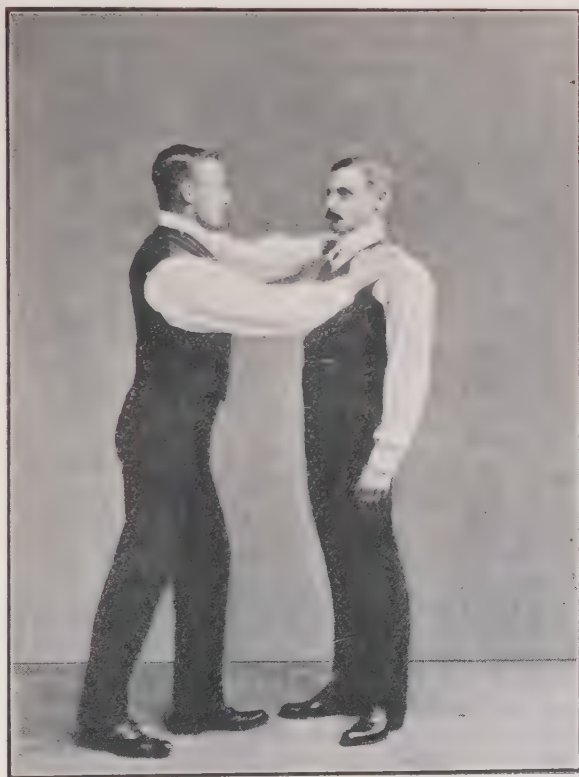


FIG. 135.

shoulder as far forward as possible; the administrator now changes the position of his hands, placing his right hand over and behind the patient's left shoulder, and his left hand in front of the patient's right shoulder, the patient then rotates his right shoulder as far forward as possible; the administrator now changes his hands back to the position shown in Fig. 135, and the patient then rotates his body back to the original position shown in Fig. 135. The administrator offers resistance with both hands throughout this movement.

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